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OCT. 26, 1953

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Aviation Week

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October 24, 1953

Number 17

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Sikorsky's First Big Plane—1914



One from Sikorsky's first successful big plane was the Sea Hawk, a biplane designed and built by him before the start of World War I. It was a transoceanic flyer for those days—the first successful four-engine plane in history—capable of carrying sixteen passengers and a crew of eight. On its maiden flight the Sea Hawk flew for over 146 hours without stopping. Photo shows the big plane at a demonstration in 1914.



Over the years the demand for better, more dependable aircraft has been met by the aviation industry with remarkable results. The improvement in aviation facts has been one of the big factors contributing to the industry's progress.

Phillips Petroleum Company, pioneer in the field of special aviation gasoline and lubricants, has long been one of the industry's largest suppliers of aviation fuels for conventional and military use. Today Phillips is ready with new fuels for turbo-prop and jets, in addition to its tremendous capacity for producing 115/145 grade aviation gasoline.

Rely on Phillips for the finest in aviation products!

TODAY Igor Sikorsky is still a prominent figure in aviation. Having chosen to live in the United States, where the full measure of his genius can be utilized, he has made valuable contributions to the progress of American aviation. As Signalling Manager of Sikorsky Aircraft—a Division of United Aircraft Corporation—he produced the first successful helicopter in the West and throughout the world. The famous seaman is shown here giving final inspection to one of the new T-12A aircraft. 26-48 helicopters were built for the Navy in 1952.

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AVIATION PRODUCTS

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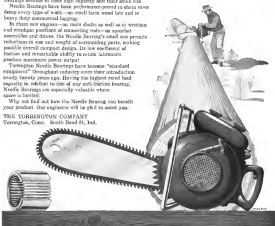
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Display model of the production version of Boeing's B-52 Superfortress, set against a cloud background, reveals the new nose and nose cabin arrangement with side-by-side seating for pilot and copilot in place of

Domestic

Eastern. **Air Lines** Constellation crashed and burned when an engine caught fire seconds after takeoff from New York's Idlewild International Airport last week. Two of the 27 passengers aboard were killed and four were injured critically, making EAL's safety record of more than 6.7 billion passenger-miles flown without fatality.

HP jet engines produced by General Electric Co. have logged more than a million flight hours since 1948 in F-86s, FJ-4s, B-47s, B-56s and B-45s, GE's Aircraft Gas Turbine Division reports.

General Dynamics, Inc., says it is still in the making but it is widely owned subsidiary, Canadian Ltd., has a possible interest in Dornier Helicopters, Inc. Dornier has been carrying on independent negotiations with Fleetway Ltd., Ft. Erie, Ont., a Canadian subcontractor, in a possible purchase of Dornier stock and to obtain production facilities for the latter's LZ-5 commercial helicopter.

Military contract orders will soon come from Wright Corp. to lay off 708 production workers within the next few

NEWS DIGEST



First Look of Production Version of B-52

models used and in the XB-52 and XB-52 prototypes. Model of the production Superfort, designated B-52A, also is fitted with auxiliary fuel tanks under the wings outboard of the engines. A sizable quantity of

work at its Wright Aeronautical Division plant in Wood-Ridge, N. J., also were officially announced last week. Approximately 19,500 workers will be employed at the Wood-Ridge factory.

U.S. Air Force last week turned over to the Royal Canadian Navy operation of an Arctic radio station set up on Peapack Island during World War II to provide weather information and navigation aids to aircraft flying the northern route between North America and Europe.

Navy is sponsoring construction of a new \$105-million factory by the Tube Rolling Corp. for production of aircraft tubing used in large propeller cases, landing gear struts, helicopter guns, rockets and Rayon guns. The 160,000-sq. ft. plant will be located at Wallington, N. J., is scheduled for completion early next year.

An Transport Act's legislation committee last week held a closed-door session in Los Angeles to discuss problems of working out a new agreement between air carriers and the transportation service concerning procedure for flying planes traveling in the U.S. with transit visas.

Producers, enough to equip "more than seven" combat wings, has been ordered by USAF for its Strategic Air Command. Production of the heavy bomber is scheduled at Boeing's Seattle and Wichita plants.

Financial

Mooney Aircraft made a "small but definite" profit from sales totaling \$75,000 during July and August, the first two months of full production at the company's new Knoxville, Tenn., plant.

Texas Caribbean Airways paid a dividend of five cents per share on Class A stock, Oct. 15 to holders of record Sept. 14.

International

Mississippi DC-8 crashed into the side of a canyon 15 mi. from Monticello last week while carrying some of the nation's top reporters and commentators to U. S. Mexico commission opening the Rio Grande's Falcon Dam. "More than 20 persons were believed killed."

Fokker Industries Aeronautics, Rio de Janeiro, has signed an oral contract with Brazil's Ministry of Aeronautics to produce 100 Fokker S-11 instructors, 30 turbine S-12s and 10 S-14 military jet trainers.

An Chief Marshal Sir Robert Brooke-Popham, former military aviator and first RAF officer to be appointed a commander in chief, died last week in Hove, England. He was 75.



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The Aviation Week

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AVIATION WEEK, October 26, 1953

Washington Roundup

Army Aviation Cut

Army aviation is feeling the economic pinch. The FY 54 budget contemplated \$151 million for procurement of Army planes, mostly light helicopters, that fiscal year. Now it is down to \$141 million, and another big cutback is in prospect. Of the \$141 million, only \$59 million has been approved for allocation.

What's more, the \$141 million that has been frozen on a temporary basis will be frozen permanently. This would mean a total outlook of about 40% in Army aviation's procurement program for fiscal 1954.

Quarles Policies

As one appreciates that Defense Department's new tier of new Assistant Secretaries would simply mean more interference in service activities, Donald Quarles, First Assistant Secretary for Research and Development, explains that policies will govern his administration. • Keep research and development activities decentralized. • Work in the services as much as possible. He will have no office in the services, and no coordination—except when a program gets "out of bounds" and there is need for top-level decision.

• Vertical strong committees patterned after the old R&D Board will be continued. That the trend will be to hold these down.

• Increased emphasis on tapping private industry and outside Government sources, working with the existing committees last reported to the Secretary of Defense through Quarles, will be set up. The trend will be toward outside contracting for research and development. Quarles hopes to bring top experts into his office to serve as after-eyes.

• Increase "selectivity" of projects through expert behind-the-scenes advice. The Quarles would agree to perfect the idea that all projects will "pass out" through Quarles, who will be set up. The trend will be toward outside contracting for research and development. Quarles hopes to bring top experts into his office to serve as after-eyes.

• Reach projects with a direct bearing on national defense. Quarles' explanation of the hydrogen bomb needed in the situation is complete.

Cooper Subcommittee

One concrete development indicates that Sen. John Cooper will lead off the Cooper Aeronautics Subcommittee, an advisory body long non-existent. Frank Keenan, chief of the division, was discussed by the senator, who took over the chairmanship of the full Senate Commerce Committee on the death of Sen. Charles McNary. Keenan's office and Keenan had "succeeded."

To be set up by the subcommittee, headed by Sen. John Sherman Cooper, is to make a thorough study of air transportation policy. Keenan was assigned to the group instead of Edward Bremer, who would then had handled aviation matters for the committee. At the time, there was speculation that the subcommittee would be a sound way for the nation.

Sen. Ed Johnson, who had been serving during his regime as chairman, issued a blast against the new trend and warned that he hoped the subcommittee "will not be used unthinkingly as a vehicle to promote selfish interests (of members) rather than the public interest."

Recher's move, plus disinterest of Sen. Joseph McCarthy in launching an investigation of the scheduled orders by the Senate Personnel Investigating Committee, seems to mean that the members will have to continue to rely on the Small Business Committee and individual members for congressional support as they fight.

One More Study

One more aviation study has been added to the menu of the Eisenhower Administration in making.

Commerce Department's new "Economic and Defense Services Administration" has set up a "Study Committee, Rail Road, Ordnance, and Aircraft Division" to watch over the health and vitality of the aircraft manufacturing industry. There is an "Economic Division" to do the same for that industry, too.

The new administration's idea is Charles F. Flowerwell, California business executive. After the pattern of the Office of Defense Mobilization, its 15 industry divisions are to have industry men serving brief periods of about six months as directors, and government expert men as advisers to give continuity. Directors for the Aircraft and Electronics Division are now being selected. Meanwhile, the new administration, Commerce Secretary Chester Wicks directed its activities.

"It is primarily an agency designed to serve business, to promote the expansion of employment opportunities, and at same time to stimulate economic growth and stability."

"It will be a listening post and sounding board for bringing business information and business opinions on vital matters relating to government and industry, including reports on business conditions, to the direct attention of the Commerce Department for appropriate action."

Renegotiation Low

Expiration of the Renegotiation Law Dec. 31 actually seems to mean little or nothing. • The Renegotiation Board says it's being disbanded. Even if the expiration date, it has already made an appointment of contracts up to the Dec. 31 date to keep it going for two or three years.

• When Congress comes back in January it is virtually certain the law will be extended and made stronger. An extension measure passed the House and was approved by the Senate Finance Committee this week, but passed Senate passage in the Senate's window job.

The board has been without a chairman since February. Members are: Charles F. Mills, former vice president of the First Boston National Bank; Frank Roberts, Detroit contractor; Charles L. Lawrence, Hartford, who has been in government renegotiations since 1942; and John H. Jett, former counsel for Executive Vice and Robert C. Jones.

Air National Guard

An National Guard employment program is scheduled to provide about 67% strength of first-line aircraft, such as F-56, F-54 and F-54 in the middle of 1955. Rest of the ANG will be absorbed into and second-line transport aircraft.

—Katherine Johnson

300,000 B.T.U. heater manufactured by Lorton Combustion Corp. for Douglas House, Miami and B&O models. The two five-unit houses also have glass porches and were built according to plans and specifications submitted.

jet engine ...

5. 1.5. The flow rate is used in the water injection system of the Diesel engine (e.g. 1.47 l/min) engine manufactured by the Diesel Engine Group at the University of Cambridge, and is used in the water injection system of the Diesel engine (e.g. 1.47 l/min) engine manufactured by the Diesel Engine Group at the University of Cambridge, and is used in the water injection system of the Diesel engine (e.g. 1.47 l/min) engine manufactured by the Diesel Engine Group at the University of Cambridge.

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Wesley H. Hines, president of Hines Cos., says that "the new breed" of developers has been "driving the market" for over 10 years.



Fluoride: water? No.



Discussion



4666 JGIM



Author

In the Front Office

D. W. Eustead, previous chairman of Civil Aeronautics Board, has been elected a director of Central Airlines. Other new board members: E. Stanley Elton, president of John F. Maguire & Co., New York; F. R. Howe, Central vice president and treasurer; William W. McGhee, former cargo chief of the airline.

T. H. Mellum has taken an extended leave of absence from Lockheed Aircraft Corp. to act as president of the Aircraft Chapter at Engineers and Architects Assn., Berkeley, Calif.

Best Case is now executive vice president of H&K Knowledge, Inc., New York.

H. Don Reynolds is preparing to attempt for The American World Airways to join Northwest Orient Airlines Nov. 17 as a route for contract to the continent.

Alexander G. Hardy has been elected president, vice president of National Academy.

Cod R. W. Knight, former USAF deputy director of flight safety research, has been appointed assistant to the president of Boeing Airbus.

Changes

Earl B. Smith will become director of transportation and communication under the Assistant Secretary of Defense for Supply and Logistics Nov. 3, succeeding Kenneth L. Voss, who has resigned to return to private industry.

Brig. Gen. Peter C. Sondetto (USAF Reserve) is now technical director of the Federal Telecommunications Laboratories, Monterey, N. J.

K. J. C. Bartlett has resigned as sales director Royal Acrophas Co., Bursard, England, but will remain on the company's board.

Robert A. Wagner has been appointed chief engineer at Hiller Helicopters, Palo Alto, Calif.

Al Hill has been promoted to assistant director of public relations and advertising for Boeing Airplane Co., Seattle. Jack Mitchell succeeds Hill as public relations manager. Bruce Wilkins

Honors and Elections

Duke of Edinburgh has accepted an honorary fellowship from the Royal Astronomical Society. Also made honorary fellows: Sir Geoffrey de Havilland, Sir Arthur Conan and Lord Duns.

Wilbur W. Brown, electronic engineer at General Electric, has received the Exceptional Service Award from the Military Air Transport Service for helping establish "total merge circuits in the installation of engines. *Aviation*, 7.

Fred L. Fleumer, director of engineering at Hammond Iron Works, Warren, Pa., has been re-elected president of the American Welding Society.

► Republic Aviation will mate a General Electric J75 turbojet to its F-84F Thunderbolt airframe for experiments to determine the suitability of the GE powerplant as a replacement for the Wright J65 now used in the swept-wing fighter. The J75-powered F-84F is scheduled to fly early next year. Final decision on switching to the J75 will not be made until after flight tests of the experimental installation.

► Northrop is at work on a delta-wing all-weather fighter designed to succeed the Hornet. The new engineering group, Northrop says that this design, based on the F-16, is a light fighter proposal that will get the company back into the USAF fighter picture. Besides, Northrop says the company has decided to concentrate on aircraft for the immediate future; other than polished matches, although Northrop's South SB-62 generally is considered by USAF experts to be the best of the current subsonic-to-supersonic missile rates now flying.

• Lockheed is modifying an F-49B all-weather fighter to accommodate the human trial of the Boeing Borex missile. The F-49 and F-99 combination will be used as a flying test bed for development of air defense missile systems.

► North American is building a two-place version of the F-55 Sabre. It is expected to fly before the end of the year.

► USAF finally has confirmed officially the maximum performance figures for the Bell X-2, first piloted aircraft to fly faster than sound. The X-2 hit its top speed of 967 mph, in 1948, reached an altitude of 73,140 ft, in 1949.

► U. S. aircraft industry has produced about 15,000 jet aircraft to date. Of these, about 1,500 have been delivered to Navy, slightly less than 2,000 to foreign countries under MDAP. Aircraft Industries Asia reported recently that about 10,000 have been delivered to USAF.

► Long-range thinking for rooftop helicopter landings in New York involves proposed installations on top of the Port Authority substation bus tunnel at 41st St. and on top of the East Side air terminal. Major drawback to such installations is the huge cost, which could not be justified until high-density helicopters have traffic because a single.

► Napier's two engines—the compounded diesel Nomad NDM 6 and the gas turbine Tland—will be airborne for the first time towards the end of the year. Nomad will fly in the outboard nacelle of an Avco Shackleton, which may come day lead to a new lease on life for the Shackleton with RAF Coastal Command. The Tland will fly in a Viking Varsity test bed. Neither engine is in production, Napier has no available floor space after setting up licensed inspection lines for the Rolls-Royce Avon.

►Gleason L. Martin Co. successfully has tested a recoverable drone system on its B-51 Mustang.

* Harsh study of troops carrying by air pointed up obvious superiority of jet transport for the job. Currently, 12 Hercules C-130s (roughly equivalent to the Douglas DC-6) would require six weeks to transport about 3,500 troops over a 3,000 mi. distance. In contrast, two jet transports equivalent to the Vickers VC10 could do the job in 12 days.

►Canada plans to outfit its new aircraft carrier *Boreas* (Aronson/Weiss June 14, p. 7) with McDonnell F2H-1 Banshees, but ordered 90 at a cost of more than \$23 million. *Boreas* will not be ready until 1976, but *Nord* Aircom is expected to use the carrier *Magnificent* to start one version to jets late next year. *Banshee* order will provide 25 planes on the carrier, 25 in storage at Bishop Naval Base and 10 for training.

* Latrol also is heliopterr: a copier bag. Fine would be to use copiers to snag what is in flight, leave it to rot and after client's business have been out.



F-100 Passes Mach 1 in Transonic Dives



LARGE INTAKE for P-40A J37 jet over head of test pilot George Welch (left).

- NAA takes wraps off Super Sabre jet fighter.
- Test pilot reports good response at low speeds.

By William J. Coughlin

Palmdale, Calif.—North American Aviation unveiled its F-100 Super Sabre here last week in a demonstration of low-level supersonic flight that shattered plate glass windows and split four-by-four timbers in the USAF Administration Building.

Test pilot George Welch climbed the fighter low across the building in three supersonic dashes that rocked onlookers with the shock of sonic booms.

► **Mach 1 Dive**—The test pilot then made a slow, baby work wheels and one fourth down flaps extended from the Super Sabre's trailing flaps.

After banking in the afterburner with a nose, he curled and headed straight up at a speed estimated at between 110 and 150 mph.

Welch later told engineers the F-100 reached well over Mach 1 in dives from 15,000 ft.

"The airplane will go a lot faster than that," he said.

► **Demonstration**—The first public demonstration of the new North American aircraft left onlookers gasping and children crying.



F-100 IN FLIGHT with engine intake extended and large intake lowered beneath the jet fighters belly, all of nose gear.

Among those gathered for the demonstration were NAA chairman J. H. (Dutch) Kerkhof, president J. Lee Atwood and Lt. Gen. Oswald Cook, Deputy USAF Chief of Staff for Materiel.

► **Race This Wing**—Prior to the flight demonstration at Palmdale, engineers were given a closeup look at the first production F-100 off North American's Ingallswood assembly line.

The F-100 displayed a new, 45-degree swept wing and tail. Afters were several feet raised.

There were no elevators on the tail surface, which was entirely flyable. Contrary to the usual supersonic trend, the tail was placed low on the fuselage.

► **Highspeed Answer**—Commenting on the unusual control arrangement, test pilot Welch said: "I think we've got the answer in this airplane to let us highspeed flight is concerned."

"It flies at 3 Mach number just as well as over Mach 1."

► **\$6,800 PL**—Coughlin, The Air Force allowed NAA to reveal that the supersonic fighter, powered by a Pratt & Whitney J57 engine, has a service ceiling above 50,000 ft and a combat radius of more than 100 miles.

All of the F-100's fuel is carried in the fuselage.

The Super Sabre is 45 ft long, 34 ft high and has a wingspan of 36 ft. It is an extremely thin aircraft, designed for ultra high-speed. The F-100 has a unique leading edge that is similar to those used on early models of the F-86.

The fighter has an automatic air conditioning and pressurizing system. A dog chute is used to shorten landing rolls.



LONG, SLOPING NOSE of F-100 is apparent in this three-quarter front view.



WIDE FUSELAGE, diamond-type canopy and leading edge that are visible here.

Titanium Shortage Blocks Buildup

Senate subcommittee calls for hundred-fold expansion of metal production for new military aircraft designs.

By Katherine Johnson

Convinced that a titanium shortage is a major threat to the United States' airpower position, a Senate subcommittee is pushing for a hundred-fold expansion of productive capacity.

The Strategic Metals Subcommittee of the Internal and Border Affairs Committee, headed by Sen. George Malone, was given this gloomy picture by Brig. Gen. Ken Metzger, chief of Air Materiel Command's Production Resources Division.

• **1,600 Tons Short**—Metzger called for "an immediate expansion of titanium capacity 'as fast as possible.' He said.

• **The 1955 requirement** for titanium in the Air Force aircraft program is 3,590 tons. But total production, estimated at 2,470 tons, will leave them 1,600 tons short of full requirement.

• **USAF aircraft requirement** for the metal will shoot up sharply during the next few years, and the shortage will be even more acute.

• **The 1956 maximum requirement** for USAF's aircraft program will be 15,000 tons. But under contemplated expansion, output will be only 25,000 tons.

"I have stated against socialism," Malone declared. "But I am adamant that we spread whatever titanium is necessary on titanium pilot plants in order to allow necessary steps to assure our airpower position will provide certain raw materials and go ahead as a commercial basis."

Other members of the subcommittee are Sens. Eugene Millican, Frank Bennett, James Murray and Earle Clements.

• **Best Advantages**—The 25,000-ton requirement calls only if USAF's titanium needs for aircraft, Metzger reported. In addition, Army and Navy have pressing requirements for the metal. For example, Army wants to use it in tank production.

"But Army and Navy have taken the position," the general said, "that due to the very limited supply, it was to the best advantage of the country to withhold their use of the metal in favor of the military aircraft program."

The three services would reduce to gross availability more than 100,000 tons of titanium annually, he said. In view of this, plus wide commercial use for the metal, Malone suggested the

U. S. should shoot for 200,000 tons a year capacity, or about a hundred times current output.

• **Importance to Airpower**—Metzger stressed these points in emphasizing the importance of titanium to airpower: • It can be produced without oil as raw material. Although current production of the U. S. is from Australian-sourced metal, approximately a third of the stockpile has extensive deposits of titanium from which titanium also may be manufactured. And particularly large deposits are in Florida, Georgia and California.

• **Feeler, lighter-flying aircraft** that are the key to future air superiority require titanium, twice as strong and far lighter than aluminum for this reason and in expense. Use of titanium is now planned in a four-engine military plane, Metzger said, since 2,000 lb of weight.

• **Extensive deposits** of titanium are known to exist in the U. S. R—and in Canada, India, Australia, Norway, China, Brazil and Sweden.

• **Of the untapped expense**, capacity for only 11,400 tons a year by 1955 has been considered. This is divided: Titanium Metals, 3,600 tons; du Pont, 3,600 tons; and Inco, 4,200 tons.

In addition, output at a facility at the Bureau of Mines at Boulder, Colo., will reach 200 tons a year. U. S. imports about 10 tons a month from Japan.

• **Confidential Study**—Despite its high cost of \$15 a pound, titanium would be profitable for use as a commercial alloy if it was available because of the increased payload that would be possible, Metzger said.

A study by Douglas Aircraft Co. showed that use of titanium in engine nacelles and other parts of the DC-7 would reduce the weight by 300 lb, he added, "or allow for 1.5 more passengers for the same life of the plane—and would be a bargain."

Through one of titanium, a 60-passenger plane could become an 80-passenger plane.

"But still of greater importance, I believe, and of most serious nature, the aircraft designer himself is holding

back," Metzger said. "Our own manufacturing, due to their inability to secure the material, are now postponing the date at which they incorporate the material in their design changes."

"We know at this point that the aircraft we really will design as design that we need, and the country needs, to achieve air superiority, and which meet our titanium in substantial quantities."

• **Linked Production**—They are at three titanium producers in the U. S.: Titanium Metals Corp., du Pont de Nemours Corp., and Inco Corp. Through links to be opened by production, the government would speed their expansion, but it falls far short of meeting requirements.

• **Despite a Defense Department request** that titanium capacity be expanded to 35,000 tons a year by 1974 to meet only the maximum military aircraft requirement, the Office of Defense Mobilization has authorized an expansion goal of only 25,000 tons a year by 1974.

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No Bidders

There were no bidders when Hughes Aircraft Co.'s \$1.51 billion guided missile plant was put up for auction sale by Price Company officials for delinquent taxes in Tucson, Ariz., Oct. 16.

The county claims Hughes owes \$21,854,000 in back taxes for 1951. A company spokesman said that the plant was sold to the Air Force in December 1951. Missions, he says, when the Corps of Engineers failed to file the deed for USAF in Price County.

It may require conferences between federal and county officials to straighten out the legal confusion.

• **Navy Cuts—Vice Admiral John G. McGee, new Chief of the Office of Naval Material**, reports Navy cut its 1950 backlog of 711 letter contracts valued at \$11,135,000,000 to 572 letters valued at \$4,646,577,000 by Sept. 10.

At Price Secretary Harold E. Telford, authorizing AF policy, said:

"Letters of intent and letter contracts had their place in the emergency after the outbreak of the Korean war, but I see little reason for them now."

The Air Force is interested in reducing the number of letter contracts as far as possible. Some are being canceled and others are being converted to formal contracts as fast as possible.

"Requests for new letter contracts are being scrutinized with the greatest care. Most are being returned with the request that every effort be made to write and sign formal contracts. Only in emergency cases should letter contracts be used. Then it should

definitely be understood that a formal contract will follow in the agreed 90 days."

• **R-47 Cuts—USAF reports** its inventory of \$2 billion was due mainly to conversion of letters of intent for the Martin B-57A and the Douglas C-124C to firm contracts and cancellation of letter contracts for a portion of the B-47 production at Boeing-Wichita, Douglas Tulsa and Lockheed-Memphis.

The B-47 accounted for a reduction of \$600 million and is reported to be the highest-rate letter contract ever written for a single aircraft type. The 533 million General Electric letter of intent for the J73 turbojet engine also was converted to a firm contract during this period.

Most of the 156 USAF letter contracts outstanding on Sept. 30 are expected to be converted to firm contracts as ordered by JCS, 1, 1954. Most of the cancellations will involve aircraft engine types already announced as scheduled for production.

Army only has 29 letter contracts valued at \$156 million, reports all have been converted into firm contracts.

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USAF PILOTS FLIGHT TEST CAPTIVE M1G

Early evaluation tests of the captive M1G-17 on C-119s have produced an official Air Force verdict that the Russian-built fighter possibly is inferior to an F-4. Comments, the North American F-4G John. Gen. O. F. Woyland, Far East Air Force commander, reports that flight tests made by Maj. Gen. Albert E. Rupp, commander of

Wright Air Development Center, Dayton, Ohio, and Maj. Charles Young, test supervisor, pilot, revealed the M1G had lower maximum speed than the F-4 and lacked automatic equipment and control systems to U. S. fighters. Rupp and Young reported that lack of such equipment kept them in the air, that their attention was diverted from

short flying, head-on attack was noted, along with a poor turning and maneuvering system. The weight is too small for American, the pilots reported. As yet there are no reports of Soviet or North Korean demands the M1G's return, although the U. S. has offered to turn over to the Soviet Union. Most USAF rankings

Air Force, Navy Pare Letters of Intent

Both Air Force and Navy are ending dramatic efforts to eliminate the backlog of letters of intent contracts, most of them for aircraft, resulting from the Korean crisis of three years ago.

USAF says it expects to reduce its letter contracts by the evaporation point by the end of 1957. That backlog has been shrinking steadily since the summer and only last June, USAF reported letter contracts valued at \$3,585,000,000, with a reduction to \$3,585,000,000 by Aug. 31 and to \$3,576,000,000 by Sept. 30.



HERE IS TRAPACOR 1954

First flight was of the 1954 Piper Tri-Pacer which features several interior improvements over previous models. Among them: four rubber seat cushions and individual overhead storage racks with washers. The V10 transacting antenna, heavily mounted

stop the wing, but have landed in the Rn, eliminating considerable wind noise. Fuel tank is the 155-gal. Lycoming, giving the lightplane a cruising speed of over 140 mph. The last plane from the midwest building was being produced at Look House, Ia.



Douglas Skyray Viewed Close Up

Interesting design features of the steel-skinning Douglas XP4D-1 Skyray are detailed in this series of closeup photos only recently released by the U. S. Navy for publication. These pictures show for the first time the Skyray with its wingtips folded to conserve space when stowed on board a carrier. Another noteworthy feature is the vertical corner airwing post, detailed in the two bottom pictures. They show that a small tailwheel is fitted to the tip of this airwing post.

The Skyray features a modified delta wing with slightly swept trailing edges. It spans 33 ft. 6 in. and is 50 ft. long. Inboard on the leading edges of the wing roots find a single Westinghouse X210-WE-8 turbojet, which, with afterburner, delivers 11,600 lb. of thrust for short periods. With this power, Lt. Cmdr. James B. Warden on Oct. 5 set a new world's absolute speed record of 755.4 mph over a three-kilometer straight course at Sotomai Sea, Calif. (*Aerospace Week*, Oct. 12, p. 16).

On Oct. 17 Douglas test pilot Bob Kahn flew a Douglas XP4D-1 at an average speed of 738.118 mph around a 300-km. (187.5 mi.) closed course.

The Douglas Skyray has been undergoing evaluation tests, including carrier suitability trials, at the Naval Air Test Center, Patuxent River, Md. Production models of the plane will be powered by the more powerful J85WA-17 afterburner turbojet delivering approximately 15,000 lb. thrust. The plane is being built for the Navy at Douglas Aircraft Co.'s El Segundo, Calif. plant.





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AIA 'No Raid' Pact Draws Fire

Engineers say agreement cuts down bids offered for new talent but fails to stop recruiting program.

Los Angeles—A "no raid" agreement between Aircraft Industries Assn. members designed to curb expensive competition for engineering talent is drawing criticism from aircraft engineers who call it an unfair labor practice. "Prohibited," "unfair," "unethical" and stranger terms have been used by engineers in denouncing the pact.

► **Backfiring Pact**—But the so-called "gentlemen's agreement" is apt to be more honored in the breach than its observance.

It has been unsuccessful in stopping raids on engineering talent by engineering firms but appears to have reduced expensive bidding for engineers, observes one. The aircraft engineers still can change jobs freely, but he gets paid less for doing it.

"This," and one engineer, "is the gentlemen's agreement between gentlemen who are putting each other on the back with our hand while they hold a stick in the other."

"That whole thing makes the engineers in real as hell," another said. ► **Repeal**—The agreement was introduced to meet the competitive situation among firms in the shortage of engineers. According to information given this morning, the no poaching pact was then. Each company agreed not to lure any engineer still employed by another firm, without a release from that firm.

But in practice, it would like that. "A man comes over from Bunk Aircraft Co. to talk to us," said one member. "We discuss the situation, he tells us an application. We tell him we can't possibly hire him because he still is working for Bunk. But we also tell him, for example, that if we were in a

position to hire him, we would pay him \$10 a week more than the going rate."

► **Salary Double-End**—An agreement to hold down salaries apparently followed when aircraft firms reduced the "no raid" pact was being bypassed through subterfuge.

"It was conspiracy," said an official who had just returned from a recruiting trip. "We try to keep any increase for an engineer, we're being drawn to \$50 a month. If possible, we hold it to \$15. The other companies follow the same pattern, so this holds down salaries in spite of the shortage."

Like the "no raid" pact, this is a controversy.

► **Contact Problems**—"There is a gentleman's agreement not to poach in each other's area, but this is not an official AIA action," said a spokesman for the Aircraft Industries Assn. "Obviously, AIA would be against such a thing."

Nevertheless, Aerospace Week is told complaints concerning breaches of the agreement have been made at AIA committee meetings.

"The trouble is," explained one consulting executive, "that this is a gentleman's agreement between people who still are faced with a problem which must be solved—since we get a new contract, we have to get new people. How else are we going to get them?"

► **Recruiting Practices**—A top engineer, who had just completed a several-week recruiting tour at the East for a major Southern California aerospace plant, discussed the situation freely.

The following quotations from his candid remarks indicate some current recruiting practices.

► "If the Southern California plant is

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ANGLEgear are described fully in the LAS Aeronautical Engineering Catalog. Refer to this publication for complete information, or write us direct.



PUNISHER RACER HAS Y-TAIL

Model Series S-1 race built by Acme Aircraft Co., Tamm, Calif., features a pusher propeller mounted on an S-1. Constant speed engine. Air cooling system is located at

the wing root. Note the Y-tail configuration, with tail wheel located at the bottom, providing clearance for the two-blade prop. Wingspan and length are about 30 ft.

Temperature Warning System



Recent version of the U.S. Navy's Neptune in this PVV, developed solely by the Navy and Lockheed for use in anti-submarine warfare. Shown above is the gear of the system protected by the Edison alarm system.

A NEW EDISON Temperature Alarm System keeps its sensitive "Eagles" on three spots in the aircraft drive system. Should the temperature at any or all spots rise to 130°C, an alarm automatically signals in the flight compartment. The electronic drive system is so designed that it can be immediately disengaged before serious damage can happen.

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"We can't go into Dayton. We have to stay away from Wrightley (Wright-Patterson AFB, Dayton). But Chicago is not an airplane town. Can we help it if somebody sees our ad in a Chicago paper and comes up from Dayton? Sure, we pay him expenses."

"We follow the contract picture on ourselves. If there is a catch at, say, Canton Pt. Worth, every smart cowboy will have a map in a hotel room in Ft. Worth within 14 hr."

"We can't set up shop openly in Seattle, for example, because of the agreement. But we can go up for interviews at the University of Washington. If the wind happens to get around through a friend at Boeing that we're in town on a talent hunt and staying at such-and-such a hotel, can we help it?"

"An ad in the paper at an engineering convention that a recruiter is there in a hotel room shows pay dividends."

The above quotations indicate some ways of getting around the pact.

►Talent Scramble—The scramble for engineering talent reached such a point, Aviation Week was told, that the producers of one of USAF's new supersonic prototypes demanded an agreement from two subcontractors turning out the wing component that they would not raid each other's staff.

The price producers made the open market an unworkable part of the subcontract to keep subcontractors from shopping at other plants. Nevertheless, it was not long before one subcontractor was complaining that the other had violated the agreement.

Practice on salaries varies from firm to firm.

"If a man comes to us and asks outright for a raise, we give it to him, old or engineering executive. We don't want him around if he doesn't want to stay."

Other companies look on it differently. (That has been called the "a hole's a hole" attitude.)

►Pence Intrigue?—Complexity of equipment: "The only perceived threat to the disadvantage of it is the expense. It lives for miles and hence its program."

Another complained much more warmly with the demand: "Isn't this a breach of contract upon the constitutional rights of American citizens? Isn't this employing coercion, intimidation, and subduing to deprive Mr. U.S. Citizens of his right to fair employment practices? In short, isn't this an unfair labor practice in the true sense of the word?"—WJC

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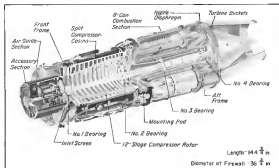
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AERONAUTICAL ENGINEERING



Analysis Bares J47 Jet Design Details

First overall study reveals makeup of GE engine that has racked up more than a million flight hours.

The General Electric J47 turbojet in its various models in the powerplant has a string of Air Force fighters and bombers, including various versions of the F4E and B-47. It provides the jet thrust in the F-105 and B-36. Since the first design of the engine was laid down some years ago, it has racked up more than six million flight hours. But its overall details are revealed for the first time in a paper that has been prepared recently by R. E. Smith, of GE's Aircraft Gas Turbine Division.

Front End

The forward end of the J47 is made up of the air-guide section and the accessory and drive sections.

Airguide section includes five airguide vanes and inlet cones and fairings. The airguide cones are used in position ports for fuel, hot oil, air, cooling air, and throttle and engine electrical connections. The connecting lines are brought out radially through the

inlet air stream by passing through the four axial bearings. Some of the J47 models incorporate retractable inlet screens as in the air guide section. The compressor front frame accommodates the accessory drive mechanism, support for No. 1 bearing, inlet guide vane, and the balance piston chamber. Air Inlet—The frame is made up of an upper and lower section forming the air inlet passage for the air inlet. Eight strain connect the inner and outer sections.

The inlet guide vane-balance blades connected between two concrete rings—on the inlet. They are attached to the rear side of the front frame's outer section along with an oil and air seal assembly. The air seal acts along the outer diameter of the compressor fairing shell. The oil seal acts at the compressor rotor hub.

The space between the two seals forms the balance piston chamber. This is supplied with 12-stage air through the hollow inlet guide vane. Air entering the forward end of the com-

pressor inlet constrains some of the rotor's forward thrust, Seal reveals.

Accessory Drive—Accessory drive gear for the accessory components are installed in the compressor front-frame center-section. The auxiliary components are mounted on front frame pads and splined to reduction gears, which mesh with a gear on a common drive shaft coupled directly to the compressor rotor.

Auxiliary components include a starter-generator, tachometer generator, fuel regulator, fuel pump, fuel and oil pump, and oil pump. Another accessory pump is located inside the compressor rear frame.

Compressor

The J47's original compressor rotor design consists of 12 wheels driven on a steel shaft. First 8 of these stages are machined from 1-8 aluminum forgings. The last 3 are made from heat-treated 4130 alloy steel forgings, to withstand the higher temperatures of the compressed air. The large compressor rotor blades are attached to the disk via dovetail.

The wheel rim is connected by

Aircraft Powered by GE's J47

Manufacturer	Aircraft	No. of Engines	Engine Model
North American	F-86A**	1	J47-3 or -5
	F-86D*	1	J47-41 (afterburner model)
	F-86E**	1	J47-51
	F-86F*	1	J47-57
	F-105*	1	J47-2
Boeing	B-47B**	4	J47-11
	B-47D*	6	J47-25 or -26
	B-47E*	6	J47-25 (mission-related takeoff improvement)
			J47-26 (mission-related takeoff improvement)
Convair	B-58D-1, F*	4	J47-59 as addition to 6 turbo-supercharged F4U-44s
	B-76D-1*	4	J47-59 as addition to 6 turbo-supercharged F4U-44s
North American	B-57A**	3	2 J47-4, 2 J47-5, or 2 J47-7, 2 J47-8
	B-57C**	4	2 J47-12, 2 J47-11
Republic	F-105**	1	J47-57(modified for afterburner)
North	F-105**	1	J47-43(modified)
Marine	F-105**	1	J47-43(modified)
Chase	F-105**	1	J47-11

* for comparison

** *Phrynosoma munitus*

J47 Production Status

Several models of the J47 turbojet engine are in production at General Electric plants at Cincinnati and Lynn, Mass. One model is being produced by both Packard Motor Car Co. and the Strohbecker Corp. Close to 20,000 J47s have been built by the two GE plants.

axle/driveline spacer rings fitted under the wheel shoulder. Each ring is secured by an adjusting wheel nut by steel pins to carry the torque. Between stages 1 and 10, the spacer rings on the original component sets are made of 14S but between stages 10 and 12 the spacer rings are made of 40S chromalloy.

► **Improved Rotor-Seal** means that in improved type of compressor rotor construction is in production for the later J17 models. This is a new counter-rotating arrangement for more efficient torque transmission and for protection of mechanical shaft of the wheels.

Radiator assembly and demerably also is gently simplified—compressor wheels are splined together rather than shrunk on a shaft. The wheels are geared on both sides, meshed together and secured with axial tie-bolts. Removal of bolts permits quick disassembly of the motor. Small claims.

The cast 355 aluminum connecting rod (right) is horizontally split into half-sections bolted together and secured at the ends to the Dow-Corning front frame and the 355 aluminum connecting rear frame. Front and rear frames, forming the main mounting structure, are not sold.

The congressmen also have supported the first and of the combustion chambers and also serves as a support for the No. 2 bearing.

Four engine mounting pods, two on the horizontal and two on the vertical centerlines are located on the cross-section rear fuselage.

■ **Sister Blade Types**—Small reveals that to obtain maximum productivity, four types of composite sister blades are required for production organic

- Foreign forged blades are detected into exit mag, which are recorded into the status label
- Sustained walls have been found and

- Blade design has been revised and released for production
- Cast blades have been tested and released for production

• New lubricated type also is being used now in production engines. The material is rolled in long strips, contained in the proper axial section and then cut to the desired length. This section is added to a base as shaped that it fills the same area as the present black ring, thus eliminating the ring and its

When shrink occurs...



**Yield
shrinks,
too...**



Hasilnya dapat disimpulkan bahwa:

A change in getting involved in social activities

Radiography helps avoid shrink

Strink can pose a real problem in casting 340 aluminum. It did with this aluminum hot-rod.

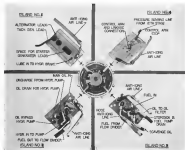
But radiographs of the pilot rams showed a recurring pattern of defects. This suggested a change in galing which quickly corrected the difficulty.

This is a typical reason why more and more families are making full use of radiotherapy.

It proves the soundness of their work—helps build a reputation for prompt delivery of good castings.

If you'd like details on how Radiography can improve your operations, get in touch with your sales dealer. Or, write us for a free copy of "Radiography as a Foundry Tool."

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X-ray Division, Rochester 4, N. Y.



Ed. AND COVERS provide further facts for fund and security investors.

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to many existing and positioning problems requiring constant sensitivity and current distribution.

These instruments uniquely developed the magnetic, smooth, linear and long lived magnetic fluid clutch meter/positioner in order to "fit" its dimensional mounting problems in some extremely complex cases. Simply and directly built, it has accurate working meter we've even seen (over 3000 hours continuous duty at rated load).

In essence, it consists of two Ti-developed magnetic fluid clutches (weighing 40 lb each) working in opposition. Input current of 100 microamps causes a 1° output shaft deflection with less than 100 microamps being measurable. Control data is optional.

If you are being plagued by a measuring/positioning problem due to magnetic, a magnet—any sensor and output—movement, you drop us a line and we'll be glad to answer your questions in detail.

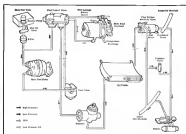
Magnetic fluid clutch meter/positioner



SPECIFICATIONS	
Motion/Position Movement	
Sensitivity	40 psi (100 microamps)
Accuracy	±0.5%
Life	3000 hr at rated load
Frequency Response	
Deflection	1° in 5 sec. at applied
	30° entry rate at 100 psi
Max. Input Signal	100 microamps
Max. Input Current	100 microamps
Output Range	—10° to +10°
Control Voltage	10,000 V, 400 Hz
Operating Rate (at 100 psi)	1000 rpm
Output Torque	0.175 to 1.00 microamps
Maximum Output Torque	0.25 inch at 4 millamps



TEXAS INSTRUMENTS
CORPORATION
100 LEMMON AVE. DALLAS, TEXAS



JET Fuel and Control System (see p. 42).

expensive manufacturing and assembly process, Small explains.

The fabricated rotor blade, he says, also provides increased resistance to vibration, gives an appreciable reduction in blade cost, and absorbs a critical materials saving.

Carried on Gas-Mounted on the rotor casing are components of the various engine systems.

Electrical meter control inside the main junction box, vibrator, ignition coils, inlet screen selector, emergency fuel regulator solenoid, and servicing valve.

Fluid system components supported on the casing include the emergency fuel regulator, fuel divider and dry

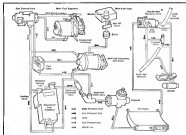
valve, equalizer manifold, large oil reservoir, and fuel piping.

Leak system units on the casing include the oil cooler, oil filter, and leak piping.

Combustion Section

The eight combustion chambers are supported at the front end by the case pressure near frame and at the rear end by the turbine frame. Quick-disconnect rings are used at the ends to facilitate disassembly.

The combustion chamber assembly consists of an outer chamber and a removable inner liner with openings to permit compressed air to enter from



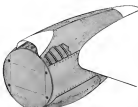
Emergency System in Operation (see p. 42).

REM-CRU TITANIUM

facts about a new metal for the aviation industry



Engine nacelle and fuselage of the new Douglas DC-7 transport will consist of Rem-Cru BC70 titanium sheet.



Detail view of the engine nacelle where Rem-Cru titanium is used in DC-7 nacelle.

Titanium is superior to other structural metals in terms of strength to weight ratio. And its corrosion resistant properties are remarkable, too. To acquaint you more fully with its characteristics, here are other facts about this new ductile metal.

Forming Properties.—You can form titanium sections of titanium on the same equipment you use for forming stainless steel. Most forming of BC-70, the standard commercially pure grade of REM-CRU titanium, is done at room temperature. Most difficult forming operations with BC-150A, a titanium alloy, are usually carried out at moderately elevated temperatures such as 300-500 F. The forming is best done slowly, without rapid or severe deformation.

You can also shear and punch titanium with the same die setup as you use for stainless steel. Titanium parts can be stretch formed, or formed on a hydro-pneum or drop hammer. But in the latter two cases you should perform the work at moderately elevated temperatures.

Application to DC-7.—A good example of the use of titanium is provided in the new Douglas DC-7 transport. Here the use of REM-CRU titanium in place of aluminum alloys and stainless steel in nacelles and fuselage effects weight savings for the Douglas Aircraft Company of approximately 200 pounds per airplane. These sections are formed from BC-70 sheet, in gauges varying from .030" to .160" and lengths up to 120". Because stretch-form the nacelle skin at room temperature, they shape ribs and stringers by bridle or roller-forming, then stretch-form them to the proper curvature. In the assembly operations Douglas both spot welds and cements the titanium sections.

Availability.—REM-CRU—a principal product of titanium—makes bars, plates, sheet, strip, wire, tubing, forgings and billets in four grades: BC-55 and BC-70 are commercially pure grades; BC-150A and BC-180A are titanium-base alloys. We are currently expanding casting and mill facilities so that within a year our production will increase several fold.

To learn about the latest developments on this new metal, write for the *Rem-Cru Review*—a free periodical devoted to the application and fabrication of titanium and its alloys.

REM-CRU TITANIUM

REM-CRU TITANIUM, INC., MIDLAND, PENNSYLVANIA

1067

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Schematic of cabin heat and air conditioning/refrigeration installation under cabin floor. All four heaters on the DC-7 are skid, with complete interchangeability of plug-in accessory components throughout for simplicity of service and maintenance work.

35 years experience in combustion engineering

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1/4" Drive for strokes over 2"
Built-in linear conversion

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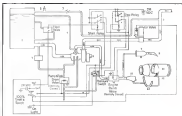
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J47 Water-Alcohol Injection System.

radical jet injection efficiency, according to Smith.

Water-Alcohol Injection—One model of the J47 (the -25) is equipped with water-alcohol injection for thrust augmentation. The water-alcohol mixture is injected through low-noise located concentrically around each combustion chamber.

These nozzles are fed from individual manifolds located around each chamber, and are fed from a single manifold surrounding the engine, Smith explains.

Turbine & Exhaust

The J47 turbine assembly is a single-stage unit.

Turbine rotor and compressor rotor shafts are geared with a splined fit between the 12th stage compressor wheel and the front end of the turbine shaft. Coupling of these parts is accomplished

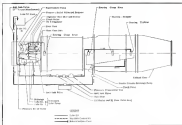
with a bolt which runs through the 10th stage rotor shaft.

The turbine shaft is supported by two bearings—the No. 3 is deeper bearing at the rear-end of the shaft, and the No. 4 bearing at the wheel end of the shaft. Turbine bearings are forged from heat-treated SAE 5140 alloy and down-drilled into the wheel rim. The bearings are not greased.

Turbine Wheel—The turbine wheel is made up of a ring of Turbine 16-75-6 vanes welded to a 4540 steel hub. Front face of the wheel is cooled by air extracted from the 8th stage of the compressor. The air face is cooled by air from the 12th stage.

The acoustic diaphragm consists of inner and outer rings of S13 stainless, between which 64 cast blades are welded.

Removal of the exhaust cone, turbine wheel and acoustic diaphragm for repair



Laboratory Section (see p. 45).

From **MAXIM** to Mars?



Not Buck Rogers space ships, ready for take off, at tough, noise-killing Maxim Silencers at the Wright Aeronautical Division of Curtiss-Wright. They're important—to everyone working there and to neighbors, too. One prerequisite for working with jets is top-notch exhaust silencing—two good reasons and, obviously, for personnel efficiency.

Here's another example of Maxim's contribution to the aircraft field. For more information, write to: **THE MAXIM SILENCER COMPANY**, 1015 Homestead Avenue, Hartford 1, Connecticut

MAXIM
SILENCERS





PARKCOATED composite steel blade (left) is cut from long strip and welded to base that takes place of base ring.

tion or replacement, without complete engine disassembly, is a feature of the design, Small says.

► **Exhaust Section**—The exhaust cone is bolted to the turbine casing. The cone cone is supported from four rods secured to the outer case.

The exhaust pipe and nozzle are supplied by the aircraft manufacturer, except in the case of the Allison model engine, where the burner and the variable-nozzle nozzle are a part of the engine.

Electrical

Electrical system consists of the starter generator circuit and the ignition system. The starter generator is a diesel-coupled 24-v d.c. unit running approximately at engine speed. During ground starts, it functions as a d.c. motor to accelerate the engine to speeds for firing—about 550 rpm, Small says. He explains that the starter provides additional torque up to about 1,750 rpm to assist the engine in accelerating to a minimum stable idling speed—1,200 rpm. When the engine reaches about 3,500 rpm, the starter-generator supplies a continuous generator load at 500 amp and 24 v.

In addition to a starter control, a voltage regulator is included in the system. There is a reverse-current relay to switch from starter to generator and to protect against a reversal of current from battery to the starter-generator when it is operating as a generator.

► **High-Altitude Start**—The high-altitude, high-voltage spark in both the No. 3 and No. 7 main injection chambers takes place between the tips of two separate single-electrode quatern. Neither of these is at ground potential—both are "hot," although opposite in polarity. These opposite polarity voltages are

PILOT PROTECTION AGAINST "G" FORCES

Aero's new "Anti-G" Valve plays a vital role in today's protection of jet pilots.

This valve links the pilot's "Anti-G Suit" to a supply of compressed air. Any sudden change in "G" force (gravity or centrifugal force caused by turns, dives or climbs) opens the valve. Air accurately metered for the existing flight conditions is admitted to the "G" suit bladders, creating pressure on the legs, thighs and lower abdomen. This pressure prevents the pilot's blood from rapidly draining from his head down into his body thus preventing "blackout".

For further details on this "Anti-G" valve and other high-precision aircraft products produced by Aero write:

The Aero Equipment Corporation,
Bryan, Ohio
Offices in All Principal Cities



MODEL 10050
"ANTI-G" VALVE
1/2" SCALE

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"ANTI-G" VALVES . . . OXYGEN REGULATORS . . . AIR AND OXYGEN SYSTEMS . . . ACTUATING CYLINDERS . . . VACUUM, FUEL AND BOOSTER PUMPS



Oddly enough, the metal fabricating process first used to produce self-igniting detonators helped put the "bite" into World War II bombers. The top power leads in the turbo-superchargers of high-flying B-17s and B-29s that provided extra speed and longer range were precision cast from high-temperature alloys by the name Microcast Process.

Originated in 1929 by Austal Laboratories, Inc., to cast non-machinable alloys, the Microcast Process today is used to produce parts and components from a wide range of ferrous and non-ferrous metals.

The Microcast Process offers exceptional opportunities to the mass production of parts and components. Product improvement through the use of better alloys, economies through the elimination of expensive machining operations, and greater freedom of part design are only a few of its advantages. Inexpensive Microcast today . . . it may well be the means of a better product at lower cost for you.

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The Misco Precision Casting Process, with rigid dimensional and metallurgical control, X-Ray and Zygo inspection, affords every assurance that customer requirements are met.

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generated by operating two identical injection coils back to back.

The system is designed only during the few seconds necessary to spin the air-fuel mixture. Ignition by the other air stream is obtained by flame travel through the cross-injection tubes, and combustion is self-sustaining.

With this high potential ignition system, high-altitude starts are possible. The main effect of air due to the forward speed of the plane causes the engine to be in a substantial speed, no matter how much by increasing ignition system and advancing the throttle.

Lube System

The lubrication system is a reverse fitting positive displacement type, composed of a three element filter and scavenging pump, a double element non-leaking scavenging pump, oil cooler, oil filter, check valve and oil jet.

► **Oil Pumps/Filtering the oil flow.** Small injection that oil from the intermediate tank enters the main lube pump through No. 2 strand. Element No. 1 sends oil under pressure and through No. 3 strand, through the oil filter to the compressor run frame. A separate jet is used to lubricate each bearing (No. 1, 2, 3, 4). A lube-oil bearing is mounted on the turbine frame bearing to maintain a slight vacuum.

Oil is scavenged from the air section of the engine by the two-element non-leaking scavenging pump. Its discharge passes through the lube oil cooler and into a scavenging manifold on the No. 3 strand. Fuel oil is injected in the oil cooler, small nozzle.

Element No. 2 of the main pump sends oil into main pressure pump, and then into two jet lubricating the main and front compressor bearings. From this system, oil is fed for the operation of the fuel regulator. Oil from the jets, fuel regulator, and the two pressure relief valves passes into a pump in the compressor fuel frame. From here it is pumped into the scavenging manifold on the No. 3 strand by the scavenging element of the three-element pump. The scavenging manifold vents oil back to the tank.

► **Lubrication Control-Status.** Lubrication is maintained by means of four check valves, one in each of these lines:

- Outlet passage of the No. 2 lube element in the governor
- Line to the main bearing from the No. 1 lube element
- Discharge line from the main scavenging pump
- Oil supply to the regulator

Fuel & Control

The fuel regulator is the governing device of the fuel control system. It determines the variable control oil

LEAR GIVES SURE CONTROL FOR COWL FLAPS ON CONVAIR 340

To MARCH its exceptional ability to "get up and go," the versatile Convair Lear 340 needs precision control of its engine cowl flaps. Positive action and exact positioning for this important function are provided by Lear screwjacks.

Lear screwjacks form but one part of a comprehensive line of Lear electro-mechanical actuating products for aircraft use. Their compact design, light weight, high strength, and precision operation spell out the reasons for the use of Lear electro-mechanical products on almost every commercial and military aircraft flying today. Let us discuss your electro-mechanical problems. We will either have the answers on hand or be able to develop them quickly.



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Combines with three similar units to complete a positive, non-reversing engine cowl flap control system for the Convair 340. The entire assembly is actuated by a common power source through a Lear system of flexible coupling, which can be tailored to increase power in additional assemblies.

(64-4)



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• Servo Mechanism Synchro-type, Type 17D-4 for 24 volts and Type 17D-1 for 115 volts in speeds of 8,000, 12,000, and 24,000 RPM are available for various applications. Special windings and advanced shaft construction can be provided on request.

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(VCO) pressure which, in turn, determines the main fuel pressure by means of the fuel bypass valve. This valve bypasses a part of the fuel discharge from the constant-displacement main fuel pump.

VCO pressure operates the bypass valve—an increase in VCO pressure increases the fuel pressure to the meter by reducing the bypass flow. Similarly, a decrease in VCO pressure decreases the fuel pressure to the meter by increasing the bypass flow. VCO pressure from the regulator is dependent upon the setting of the pilot's throttle, altitude conditions, speed, and the operating limits of the powerplant, Small says.

Bypass fuel is routed back to the fuel pump inlet. Bypassing fuel at engine pressure passes through a manually operated uncheck, through the oil cooler and into the flow divider. The divider separates the fuel, part of it going into the manifold manifold and the remainder to the large-diameter fuel line.

Fuel is then fed to the combustion chamber fuel nozzle, with the modulator for low fuel flow and the large slot acting in parallel for high flow. The large slot (manifold) is not operative and the fuel pressure in the flow divider reaches a certain value, Small reveals.

Emergency Fuel—The single-engine fuel system of the P-7 is equipped with an emergency fuel system, Small reveals.

This arrangement has an emergency fuel regulator and a check-valve actuator valve in addition to the components of the main system. The dual element fuel pump supplies both the main and the emergency system at two discharge ports, one feeding to each system.

The flow supplying the emergency system is split, part going to the check-valve actuator valve and then to the main fuel check valve, the remainder going to the emergency fuel regulator which bypasses it back to the fuel pump inlet.

Small says that fuel from the emergency system is prevented from entering the main fuel check valve because at the present differential across the valve when the main system is supplying the engine.

In Case of Emergency—The emergency system will take over control of the engine whenever the main system pressure drops below that set by the emergency system. Fuel flow through the emergency check and actuator valve to the nozzles through the main system components. But, the amount of fuel flow is determined by the pressure established at the emergency fuel regulator. This, in turn, is controlled by the throttle position and the emergency fuel pressure.

Merriam said flow is slightly lower

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during emergency system operation, thus it is on the main system, because on steady operation the emergency system pressure is act lower than the main system pressure to prevent "lever riding."

Icing Prevention

The J47-E" series engines are self-iced for all weather operation.

The frontal area of the engine or propeller to the inlet air stream requires icing protection, and the ports installed behind the bleed bypass prevent these areas and inlet guide vanes.

The bleed nozzles installed by the airframe manufacturer, also require anti-

icing air from the engine. The air sensors need no anti-icing because they are retractable in flight.

► **Hot Air Source**—Swall says that compressor discharge air is taken off a port on the rear frame, brought forward into a manifold and through a bleed No. 3 into the bleed port. The manifold also ducts the hot air to the fuel bleed fittings. Air is also a cavity at the leading edge of the fanings is discharged into the engine air stream through ports on the bearing inlet. The pilot controls the flow of this anti-icing air.

The inlet guide vanes and front frame cavity are anti-iced continuously with 120-psi air bled at two points 180

deg apart on the compressor casing. Guide vane entering air is brought through two airways into a manifold discharging into the bearing inlet area.

► **Went and Dumas**—The design of any hot air cell leakage from compressors during operation and from the combustion system when engine shutdown, a vent and drain system is installed.

There is also a test system to main two proper pressure in the flame air cell scale in the engine. The No. 1 bearing air cell seal is vented through the compressor front frame to the external cooling air flowing past the engine. The No. 2 bearing seal is vented through two ports in the rear of the compressor rear frame. The No. 4 bearing is vented in a similar fashion, with the air and oil vapor being piped from the seal to the rear of the turbine frame housing and from there into the cooling air stream.

The No. 2 and 4 bearing seals, along with the turbine frame housing, form a closed space containing tube oil vapor and air. This region is provided with a vent—the turbine frame oil separator—to create a slight negative pressure differential across it—15

Resin-Glass Tank Is Shatterproof

A light, shatterproof, reinforced plastic air-storage tank is featured in a new jet engine starter system now in production at the Utica division of Bendix Aviation Corp., Utica, N. Y.

The starter makes use of its plastic tank has been installed on a Republic Aviation Corp. F-44F Thunderbolt for performance checks in equipping the Wright J65 turbopet. Reports are that the tank has been successful and that the system will be installed on future Thunderbolts.

► **How Used**—The plastic tank—Phenolic Epox resin combination built as a 15-in-diameter sphere with walls 1 in. thick—is used in fuel-air chamber starter system as an air receiver.



TANK is made by winding resin-impregnated glass strands around low rotating cylinder.

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Now the F-44F Thunderbolt "takes back" the job from the driving of engine controls through the wheel to the driver. Air flow is possible with the assistance of the Afterside Air Assembly.

Constructed as a part of the Afterside Air Assembly system, light weight, reinforced castings, including the poppet and poppet at other components and finally the assembly into a finished unit, its application results in a reduction in the aircraft. Complete facilities permit each unit to be assembled in a completely automatic manner, resulting in a high rate of production and a high level of consistency in the final product.

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compression chambers • turbine casings • turbine casings • jet cases • burner supports • inlets • oil line supports • fuel heating • other essential components

led by an airframe compressor.

It drives and supplies air to mix with the jet engine fuel for a considerable charge to drive a turbine geared to turn engine compressor rotor, thus cooling it up for engine starting. The reservoir is recharged by the airframe compressor during flight. Volume of the tank is 900 cu. in.—enough for two starts without recharging.

► **Light**—Developed partly by Bendix Aviation, Teterboro, N. J., and Apex Electric Mfg. Co., Cleveland, Ohio, the plastic reservoir is made by Apex and sold by Bendix.

It has a constant-to-air weight ratio of about 2:1 as compared with 3:1 for a comparable steel tank. The plastic reservoir weighs 16 lb. empty and holds 8 lb. of air at 3,000 psi for a total charged weight of 24 lb. The steel tank empty would weigh about 25 lb.

► **Simple**—The straightforward character of the charged reservoir gave it a big safety factor in resistance to gun blast effects.

Best strength of the unit is 7,000 psi. It has passed cycling tests by going to 25,000 cycles without failure. Acceptance tests require 10,000 full pressure cycles—from zero to 3,000 psi—and back to zero at 10-sec intervals without failure.

► **Other Use**—Some—Bendix engineers are so sure why the plastic reservoir could not be used in other high-pressure pressure applications, such as for dash-pot door actuation, some wheel extension or shock-absorbing control devices. Use as a gas storage vessel in engine applications is another possibility.

Actually, requests have been made for information on different use tests for special engine applications.

► **How Made**—The reservoir is manufactured by winding a continuous roving of strands of Owens-Corning Fiberglas impregnated with Shell Chemical's Epox resin onto a mold made of a low-melting-point alloy. The strands are fed all under and under tension from one end into the mold. The material on which the mold revolves during the winding process is turned into the tapered hole in the container (which later accepts the control valve).

The material is cured at 240°F for 2 hr., after which the mold material is melted out and sand.

To Process Missile Data

Land-Air, Inc., Chicago, Ill., has received a contract from Navy for processing and analysis of technical data at the Navy's Guided Missile Test Center, Ft. Meigs, Calif. The firm's operation at the test center will be coordinated with and assisted by its Data Reduction Service in Los Angeles.

fastening problems *Solved*

You can reduce your costs by using our 25 years experience in the design and development of specialized fasteners. Consultation, especially in the design stage, will result in a cheaper, more efficient fastener for your product.

The self-healing nuts used in testing applications have evolved from the simple ANMSD hex nut with sealing compound. Today, the highly specialized 400H series is completely self-contained sealing unit, has solved the problem of high pressure testing tank experiment in fastener design has been made possible by a thorough study of our customer's problems.



Nutt-Shel

Manufacturers of
self-healing nuts and
bolt and nut assemblies

Fast Quality Service on . . .

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We are completely equipped to handle every requirement. Complete facilities for test, including 175" Ramsey tester.

An organization for America's fleet in wire, we carry a complete stock of all sizes of aircraft cable. 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Notes and Photos on SBAC Exhibition

London-Society of British Aircraft Constructors' Farnborough display is a double-headed arrow: it contains some of the world's best flying with some of the world's best design ideas.

The flying is spectacular, noisy and deadly.

The design ideas are strange, understated and sometimes nearly hidden on airplanes in the static park, or on the stands under the large canvas canopy of the exhibition tent.

Both sides have to be seen before you can begin to understand and evaluate the direction of Britain's aviation

progress. The two sides—while distinct—are often as intertwined as it is difficult to separate them.

• Flying, engine, tailfins and aerodynamic modifications point up the lack of altitude test facilities and wind tunnels.

• Unrighted holes in the Jetville's wing root suggest how inaccurate.

• The Swift demonstrates dive brakes and the Hunter does it.

• Hawkeye Page and Fucinal show flight designs in months of DC-10 airplanes.

• Standard Sea has glancing white



PETAL BRAKES

on Seaforce
Fud F111A
delta-winged aircraft with an only differ
ence between it and performance F111.
Bright yellow plastic, later delta at show,
is effectively slowed by these holes.



SEA MEW

tail structure shows
rough characteristics of the "stepped" design.
The structure is built in short Sea Mew
plane has constant chord, reminiscent of
cutter designs internal structure.



BEAVER TAIL

is now on V-12 de Havilland
Canada light back transport and new law
has been. Completed structure is simple,
cruel and elegant.

AVIATION WEEK, October 26, 1951

By David A. Aukerton



WING PORTS

in Gloster Jetstream
two jets
ventrally mounted for 50 mm. common or
rocket. Diameter of intake—about four
inches—about at least intake and square
location point toward rear of rocket.



TRIANGLE TAIL

of Short S.
S.S. probes
ship-shaped surface for Farnborough flight,
will be tested before further development.
Tail is adjustable inboard type. Anti
spin and brake chutes are used.



EXTRA FIN

is provided on
production. West
Land. Whence the large-scale surface out-
board on stabilizer. Layout is similar to
that of Easy Coast.

AVIATION WEEK, October 26, 1951



COCKPIT CLOSEUP

of de Havilland 133 shows difference between
jet and that of turboprop on right side engine intake. Nose intake and structure around
half ton of cable and instrument. Production version will have single tail and engine.



PROBOSCIS

of Warfield Wyvern T-4 has longish stable fighter for Royal
Navy. Shows most working jet and American jet-like
engine. Production Wyvern will get extra engine after about four
year of engine testing trouble, centered mostly around the powerplant.



NEW NACELLES

for Proteus 705 engine in Bristol Beaufighter turbo-
prop without causing electric jet thrust, further
intake already low some level in cabin. Earlier installation had exhaust out of top of
nacelle, toward gun through about 50 degrees. Place is on production for 3040.

AVIATION WEEK, October 26, 1951



DRUOP SNOOT

of Short Sea Mew
Hawley S.S.5 adjustable wing canards
exit a built-in wing area. Wing is adjust-
able on ground take to a minimum angle of 90 degrees. Landing gear is non-retractable,
must be repositioned for each angle of wing area to compensate for CG position.



FOUR-BLADED ROTOR

is modification made by Westland Aircraft
on Hawley S.S.5 built under license. Blades
are all metal and are being tested to improve speed performance of the rotor, and for
possible application to more advanced designs. Craft comes with RAF and Navy.

AVIATION WEEK, October 26, 1951

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SAUNDERS-ROE

models of flying boats—the official last came in British aviation—and flies the graceful Pteronova over, programs in grey and white with gold trim and a white propeller. The photographs on these pages are an American observer's "notebook" on this year's Farnborough show.

Flight Demonstration

The amplifier system Marts met guests, announced the schedule—no Pteronova, no Comet 2—and explained the new rules for safety. The Flypast—The first group of planes gets off. Led by the Westland Wyvern, first shown in 1949 and just now getting into service, they fly past. The big Avon Shackleton, a four-engine Coastal Command maritime reconnaissance plane, took off on a single takeoff engine.

Helicopters—Westland's Sikorsky, Saco Shuster, and Bristol 171 and 175—performed. One showed the 175—equipped with stub wings and four-door propellers and easy into the air; the aviator says that apparently the pilot had decided to demonstrate single-engine takeoff.

Two Canberra fighters for island, and leap from local bases like bomber fighters. Bristol Olympus engines thrust one up at a steep climb; the one following rises up like a soldier on the tremendous power of a pair of Rolls-Royce RA.14 Avons.

A bright and Avonjet Aiglet, Bristol Pteronova, shows that all the flying isn't highspeed. Pteronova, probably the best amphibious plane at the display, keeps its Aiglet over the runway in a series of maneuvers that words are pale to describe. But they include inverted stall rolls over the top of a wave, stall turns in the same location, one-wheel "Lifting" landings.

Individual Demonstrations—Three came a variety of individual demonstrations by large and small, fast and slow, military and civil.

Impressions: The hovering white of the Glavin Jetlinx, with modified air

craft, to meet 6000 spec for 40 minutes, was dashed for the propulsion, low way to extend rather to forward flight.

includes this year; it looks slow for some reason. . . . Hamilton Pteronova's bright yellow P111A, darts in fast and quiet, petal door looks really work.

Blackburn Beverley bomber demonstration shows slow landing over after big buildup by movement during takeoff. It glides to a halt, reverses all prop, backs up, cuts power on one track, propeller in a 90-degree turn on the runway and then tumbles off. But it took yards of runway to get airborne.

Vickers' Swift takes off fast and flat, snapping wheels up and closing doors in fractions of a second. . . . Jet's are dotted fly by and wind up the dance stations.

Static Displays

San Copter Co.—Standard Roe for barrel a model of a proposed for the BBA coach helicopter. Designed as a 49.50 motor, the BBA craft uses a tandem rotor layout for vertical lift, and a high-speed rotor wing to extend the rotor system for forward flight. Propulsion is provided by a ducted fan installation mounted at the rear of the fuselage.

Seen look over the controls of the Cima Co. in 1950, and has since done considerable experimental work in the rotary wing field with the little Shuster and the big Avon Hawk. Personal P-85—The DC-8 replacement, one of five currently being designed or built in Britain, was shown in model form. It is an exceptionally clean aerodynamic design, with high-lift wing and pusher turbo-propellers. Powerplants are unspecified Napier engines, which might be the Elmhurst.

Great weight is about 26,000 lb., passenger capacity is 36 with seats at a 14-in. pitch. Total commercial range length has been estimated at 300-nautical miles, and the corresponding cost is about 2.2 cents/passenger.

An evening walklight was the off-again, on-again appearance of a model of the Pteronova P-14 prototype at night. The Ministry of Supply security officers



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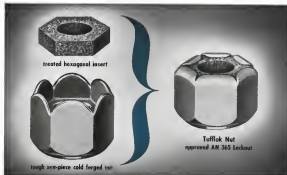
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FIFTY YEARS AGO aviation was born. Fifty years ago the Wright Brothers called on Jersey-Vacuum for the finest oil to lubricate their search engine . . . Mobiloid!

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Tufflok Nuts are economical—have been proved by use and by test. They are approved against Air Force-Navy Aeronautical Specification AN-N-66 on self-locking nuts and are listed in Air Force-Navy Aeronautical Bulletin ANA 159c as an approved AN 365 Part under Nylock part numbers.

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TEST VEHICLE for missile development
is this early Armstrong Whitworth job. Bomber cluster is unique approach, differs from tandem installation found in U. S.

removed the model from display after the first day, and then let it go back to again at the end of the show. Boat showed a Nijger low-pressure system (presumably from a gas generator and based on the compressive action of the fluid), this was little except a driven by tip propellers through vanes at the ends of its counter-rotated blades.

Guided Missiles—Armstrong Whitworth showed a complete missile test vehicle which was probably about five years old. The body was the typical cone-cylinder configuration now familiar in the missile field, surfaces were triangular with double wedge surfaces in a dorsal layout. Bomber cluster was formed around the engine, instead of in the tandem arrangement favored in the U. S. Eight solid-fuel rockets were paired together, vanes had angularity to divert thrust outward for climb braking, and a wedge-shaped acid cone was fitted to provide a radial force outward during booster separation.

Only other evidence of missile activity in the country was a model of a highly swept, T-tailed missile on the Perry stand. It represented a project proposal that died on the drawing boards.

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EQUIPMENT



TRANS WORLD AIRLINES' N. R. Farrel (left) presides over a conference at Champion conference. Other attendees (left to right): N. K. Davis, United; W. H. Wolski, KLM; R. W. Farrow, Trans-Canada; J. M. Swanson, Northwest; P. W. Lockner, Eastern.

Report on Sparkplug Meeting

Experts Study Misfiring, Fouling

Champion conference reports results of TCP tests, reveals findings of ignition and engine analyzers.

By George L. Christian

Tellico. The latest advances in the field of spark plug testing were presented by 140 experts gathered here recently at Champion's Annual Spark Plug and Ignition Conference.

While the subjects discussed were not in themselves new, fresh developments were noted concerning the anti-fouling additive, TCP (disodium phosphate), and spark plug fouling in general; engine and ignition analyzers, distribution and inspection, and jet ignition.

The three-day meeting drew attendees from the U.S. and overseas—less airlines, from equipment and accessory manufacturers, from oil companies, from military and government groups. **TCP.** Today—Theory! phosphine, Shell DA's anti-fouling additive for which very high ratings had been held out, has settled into its true perspective.

TCP is not a cure-all—Shell never said it was. It allows plug fouling under certain conditions, but in some instances has adverse effects on exhaust valves, corroding heads and cracking faces. Most troubling operations, especially those involving the 200-psi. Bell 47-B1, find TCP essential to their operation. It is the only way they can keep plugs in the engines.

Here is a quick glance at the TCP picture as it now stands. No wide-scale surface tests are in progress or contemplated. American, KLM and TWA have discontinued their tests.

United is undertaking a limited test. TCP will be used at UAL's main-

tenance base in San Francisco to place test units on test rigs, etc. Wright also is starting tests with the product.

Shell says it has no immediate plans to market TCP without first in a more normal operation. On reason is that clogging of telescopic diagnostic tools, because, experienced by Northwest Airlines on its Boeing Stratocruiser, makes TCP test assemblies at that installation. Shell says it will not consider marketing TCP until it will be proven compatible with all known types of aircraft engine installations.

Aircraft after fast TCP is highly effective in eliminating fouling at low altitudes, can result in serious power loss.

TCP Value. Other comments on TCP: **It does not adversely affect aircraft combustion systems, fuel tank systems or carburetor diaphragms, the meeting was told.**

Intermediate-type exhaust valves are less vulnerable to TCP than recent-type valves.

Backfiring at takeoff has been reduced by 90% on DC-6s that use TCP, Scandinavian Airlines Systems reports.

TWA tested TCP on five 149 Cessnas and reported five other 0% in control. Shell did not find any significant difference in total quench plug removal. Maintenance records did show that the TCP aircraft had a lower plug removal rate but total number of removals was obscured by the plug fouling practice.

Cylinder removals were 24 hours higher on TCP engine than on non-TCP engines.

As For Force cited a quarter-million hours on R4300s in R-43s using TCP

with a 60% reduction in plug foulings.

Pratt & Whitney reported TCP has no detrimental effects on engine case, power, mixture of the exhaust system.

Rolls-Royce found TCP was a complete cure for lead fouling, but care was taken that the dosage is as at the liquid-cooled Merlin engine is increased.

R.R. found that globules deposited on plug and caused pre-ignition, and exhaust valves were fouled.

Why Misfire?—Continued expansion of spark and engine analyzers has revealed that, at takeoff power, several quench plugs in an engine misfire. The phenomenon is not usually accompanied by noticeable loss of power and generally ceases immediately at the first power reduction. This phenomenon is not to be confused with backfiring at takeoff, which does result in power loss.

To quote R. K. Chiving, Champion's chief engineer: "A new hypothesis has been evolved which demonstrates that what has until recently been considered a fouled plug pattern is now recognized as a misfiring pattern which may or may not surface continuously."

"The correct discharge is a misfiring plug does not occur between the electrodes of the spark plug. Rather, it follows a path along combustion on the cast surface to ground."

Spikes at the meeting said that the misfiring does not occur on brand-new plugs, presumably because the most common of new plugs is free from irregularities. But they pointed out that new plugs are as susceptible against misfiring even on the first takeoff.

In the brief test it takes a place to start its engine and test, in the takeoff runway, sufficient contamination can accumulate on the non-erect engine to produce misfiring.

Al Yawson of Pratt & Whitney Aircraft stated that during tests conducted at PWA, as many as 25 plugs out of a total of 35 in a R4300 had been observed to "black" or misfire during a single full-power run.

But even with that many plugs misfiring, no power loss was recorded on the standard engine instruments such as the BMEP gauge. Dynamometer tests showed that horsepower losses under conditions of multiple misfiring were no more than 25% for the R4300.

Analyses. Most major airlines at the meeting either had bought engines or were concerned to. Trans World Airlines and it was told on the floor.

Philippe Air Lines reported it was using vibration pickups in its test cells to check newly installed engines. John Kinsland, a PWA speaker highly at the setup, cleaning the pickups, installed on each cylinder, were particularly helpful in spotting expansion valve



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Dramatic Proof of AVIATION PROGRESS

Back in 1927, Charles Lindbergh hopped the Atlantic—one way—in his "Spirit of St. Louis" plane, and furnished the news story of that decade.

During the past summer, Peter Gluckman touched his first Luscombe down on California soil after spanning the American Continent and the Atlantic, not once but twice, and created scarcely a ripple outside his own home town.

The matter-of-fact acceptance of that round-trip trans-Atlantic flight, in a plane vividly stock except for wing tanks, speaks volumes for the strides made by aviation in the 26-year interval between the two events. With airplanes hopping across every day, neither Peter Gluckman nor the public seems to have viewed his flight as other than routine.

Mr. Gluckman undertook that flight entirely on his own initiative, asking no help from Continental Motors or anyone else. Nevertheless, as manufacturer of the CVO engine on which he staked his life, this company naturally finds intense satisfaction in its outcome . . . in the fact that Continental stamina, fine product of advanced engineering and strictest quality control, has again proved equal to a challenge far greater than could possibly be encountered in normal use.



Continental Motors Corporation
Aircraft Engine Division
MUSKOGEE, MISSISSIPPI

action and fueling valves before engines were placed in service.

National thinks Scatilla's load control is helpful in finding marginal plugs. Trans-Canada Airlines' Bay Farm agents, provided load control system is properly understood and calibrated.

Operation of both Scatilla's ignition and Sperry's engine analysis was praised.

National and Northwest like their environments. Philippine said it could not maintain its tight schedule without its Sperry unit. Capital and that in Sperry units, installed on Corsairs, used two engines with cracked cylinders, so carrier feels that analyses have already paid for themselves.

TCA, using the Scatilla unit on its magnetic test stand, has turned back some 10 defective plugs with zero hours on them. TCA's last word for the analysis.

Scatilla is investigating vibration pickup, but believes that there is considerable question whether vibration equipment is warranted if it is Scatilla can make use which can be used with present types of analysis.

► **Plug Feeling**—Richard Tessel of Chrysler presented a new theory increasing the reason for spark plug fouling. He suggested it was not absolute temperatures, but differential between, which affect plug fouling rates. The greater the temperature spread between hottest temperature conditions (load) and long-term temperature conditions (cruise), the greater the possibility of fouling, Tessel believes.

Chrysler's Christie stated that the electrical resistance of deposits is temperature-sensitive. He added that the type and quantity of deposit laid down on the face of a plug are a function of heat of the zone (which varies from about 1,400°F on the tip to 550°F on the base).

The two basic types of spark plug fouling are carbon fouling, resulting from prolonged low-power operation on the ground, and lead fouling, which interferes with plug operation.

► **UAI Study**—Scatilla's investigation by Skottin is a result of a study of unscheduled spark plug removals from R750 engines used in DC-3s, 48s, and Corsair 74s, were presented.

Using new and used plugs, UAI found that the optimum plug performance on the R750 is 300-400 hr. Performance drops off rapidly as the 500-600 hr. bucket UAI has had to back off from as good as a 500-hr. cost trial period for the R750.

Plug removal rate on the R750 installed on the company's Boeing Stratacruiser is 600 hr. Being operations in general agreed that the engine a day to plug.

Rolls-Royce's Harold E. West noted

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Delta-C&S Air Lines

GENERAL OFFICES: MUNICIPAL AIRPORT ATLANTA, GEORGIA

August 24, 1953

Vickers Incorporated
1400 Oakman Boulevard
Detroit 26, Michigan

Attention: Mr. F. T. Harrington, Vice President

Dear Mr. Harrington:

It was interesting to note that both Delta and C & S while still separate companies had specified Vickers pumps, motors, motorpumps, accumulators, valves etc., for the hydraulic systems of new Convair 340 aircraft. Vickers hydraulic accessories were already in service on the DC-6s and Constellations. This simplified integration of our flight equipment at the time of the merger.

Working separately, Delta and C & S arrived at the same reasons for specifying Vickers Hydraulic Accessories. We wanted accessories which would have outstanding reliability, high overhaul periods, low overhaul costs, interchangeability between aircraft and minimum parts stock requirements. We also wanted the attention of service personnel when necessary, ready parts availability for normal overhaul and repair plus indications of continuing product improvement. As a merged company (the fifth largest U.S. Airline), we still feel that Vickers and their Hydraulic Accessories meet our requirements.

We thought you would like to know that Vickers accessories have also been specified for our new DC-7 aircraft. We are sure your company will continue to provide the effort and attention necessary to maintain the position you now enjoy with us.

Very truly yours,

DELTA-C&S AIR LINES



C. H. Doleen
Vice President, Operations



Serving the Heart of America
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that plug feeding is no problem as the Merlin engine provided the charge (ball machine) transparently a properly controlled to stay over 20°C. TCA keeps charge temperature at 40°C. Temperatures are constant in automatic and only when charge temperatures drop below limits. This position the engine only a few hours.

• New vs. Used—The debate is to whether it is worth the cost and effort to recondition plugs contained

• TCA: "Reconditioning plugs cost as much as buying new ones. We use plugs once, change the platinum electrodes and check 'em over. Some 95% of plugs that were removed from tested O.R. ... Rough testing is valuable"

• USAF: "Each time we go to reconditioned plugs, reconditioned plug removed after 1000 hrs."

• TWA: "At least 95% of the plugs removed because of malfunction are unrecycled reusable"

• Continental: "We have no faith in the bomb timer. But all plugs removed because of poor 3000th engine number readings are thrown out"

• EAL: "On 32500 engines (DC-4), second-run plugs are in good as first-run units"

• KLM: "Only new plugs had been put in 32500 engines (DC-6 & 440). There was no improvement in performance so we returned to using overhauled plugs"

• Plug Cleaning—Vapor Heat Machine being Co. is working on a plug cleaning machine which will cost about \$1,000 and will clean two plugs at a time in 15-20 sec.

The machine will be available shortly after the first of the year.

The company says it may be used with electric solenoids since it provides simple protection to explosion built in pump helps to keep above in suspension without excessive compression in compression. The cleaned machine when plugs at 21 gpm and cleans the electrode and of plug and the first couple of threads. It does not clean hard end of plug, so a second operation is required.

USAF had clean spark plug bursts at of great importance, especially on high-altitude operations.

The three types of chemical changes—ammonia, carbon, and carbon hydrocarbons—were not found. Champion does not think any-solvent solvent is effective and the two hydrocarbons have the disadvantage of being highly volatile.

KLM, which told test pilot's meeting it did not clean spark plugs but merely swapped them, this year admitted to substituting "very bad" plugs.

TCA states highly of a Lodge-developed ammonia-acetic acid spark plug solvent. This is the first certified bulk clean—cleaning 50 plugs at once, the

solvent tanks. Method is to squirt heated chemical into plugs under pressure.

• Plug Tester—Notional Airline's acquisition described an analysis plug testing machine. He cleaned the device, a home-made "Rube Goldberg." "Maple" spark plug operation in an engine fairly exactly," in spite of the fact that plugs are not heated.

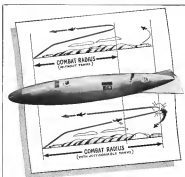
Reg involves long plugs while firing and is subjected to 100 psi. C.D. Patterns are checked with an analyzer.

The machine does several things. It teaches every what to look for in the way of spark plug patterns, so the analyzer's scope. It keeps defective

plugs after overhauled. As for NAL, put it. "The machine proved to our satisfaction that bomb testing of plugs doesn't test a thing. . . . Many plugs looking satisfactory in the bomb test showed up as defective in the home-made rig. . . . And defective plugs turn up just to defective after overhaul, an improvement a noted."

• Backfiring—The seating was worried of the trend of excessive ground operation without periodically heating and plugs, especially when immediately followed by takeoff.

Pilgrimage: An Lufthansa noted that back firing at takeoff occurs much more frequently at night than during the day, where



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Birmingham, New Mexico

the result stays on the ground for relatively long periods of time. In most stations, where planes stay on the ground is relatively short, have come within four days of backing. TALL's statistics reveal that of 35 instances of backing, 25 occurred at originating stations, only 5 were noted at en route stops.

Schaff's remedy for backing on the DC-6s and 48s is to keep out plugs (immediately after engine ramp) by sitting cockpit passenger at 30 or 40 or 60 feet barometric pressure, then gradually increase power (slowly) setting. Although cylinder head temperatures have increased 10-15%, NAC says that back firing has been reduced over 90%.

Good Plug—Paul Kovic of American Airlines proved Champion's 1-in.-20 high-altitude spark plug. He said it functions very well and has practically solved the problem of barrel backfire.

Fairfax's Ted Luckert said the plug, although labeled a high-altitude unit, functioned well at all altitudes. The company is going to a test-wide conversion of the plug.

Wright Air Development Center recently will be using the plug along with the Bell. Bell program will be credited on a replacement rather than a credit basis.

The Bell-Champion's R111 plug has been approved by P&WA for all portions of the B2500 engine. This plug was selected in August 1953 for service test.

P&WA says Champion's R175-1 plug is in all portions on its B1800s installed in its Martin 7-22s and 4-4-4s and finds them "consistently successful."

BAL, tried 2,000 R175 plug made by AC Sparkplug, but found the plugs

because of electrode bridge trouble. Magnetics & Dynamics—Magnetics still are a source of trouble to the airline but sufficient are being supplied to troubleshoot. This year's record was better than last year's. Distributors are unimpressed at an engine. On the B1800, for instance, they give a considerable amount of trouble. Yet about the electric end on the B1120 gives a much better account of itself. Possible explanations are differences in temperature between the two engines and variations in types of operations—altitude, power, etc.

The American World Airways' representative had a suggestion to engine distributor performance. Redesign the end to make better connection and have a rotating connection. This would allow the connection to be replaced to a true standard. Scams and this could be done, but a lot of new trouble might well emerge from the new design. The manufacturer volunteered to redesign the distributor finger if some airline would give a check book to support it.

Jet Ignition—Ignition system and jet engine manufacturers were in fairly amiable agreement that high-energy, condenser-discharge jet ignition is a requirement for jet engine operation. Electrode cushioning is more jet quality headache and the jet engine system completely eliminates the problem. Also, the system allows weights at high altitudes.

But there was disagreement about which type of condenser-discharge system was the best. General Electric spoke for triggered high voltage (10-15 kv) type in certain cases. Balloons from the electric surface gap knowledge (10-15 kv) type, saying that



CANADIAN SCHOOL FOR TSO TECHNICIANS

Concluded at the request of the Royal Canadian Air Force, is running a school for RCAF service technicians in its new 17th, Ottawa, IL, longer. Present operation is on the Lockheed T-33 two-seat Shooting Star. Similar course are planned on the B-56 Skybolt, instructors, chosen from Canadian's technical staff, teach these subjects: engine, engine, electrical instrument, aircraft, communications and radar. Carefully, the 4-week course fills into two parts. The first week, all students receive

the same instruction so that each specialist knows something about the others' work. The last three weeks are given over to jet engine instruction. To date, the school has graduated more than 219 technicians, some to become instructors in the RCAF. Consider has also designed and built B-56 and B-11 mobile training units, incorporating some 17 different instruction packs, which have been sent to RCAF training schools. Later, these training units will take over all six basic technician instruction.



from JOY AXIVANE AIRCRAFT FANS

The Boeing B-47 levels at altitudes where the temperatures are somewhat less than during 5000 the cabin is pressurized, the pilot wears no mask. Unless prevented, the moisture in his breath would quickly condense and freeze on the plexiglass windshield and canopy leaving him with no vision at all.

Boeing engineers installed a Joy AXIVANE aircraft fan, with integral heating unit, behind the instrument panel. Hot, dry air, blown through a Y-duct to both sides of the windshield, prevents frost at any altitude. It also eliminates the frosting of windshield fog upon rapid descent into warm air.

This AXIVANE fan, standard on all B-47 bombers, is only 14" in diameter and 6 1/2" long, and weighs a scant 5 pounds, yet it produces 640 CEM at 3" W.G. Heater rating is 1500 watts at 27 volts. For safety, the heating element is thermally protected. A & N design specifications throughout.

Joy designs and builds each fan to the exact requirements for which it is intended. Each fan, therefore, is custom-engineered for highest efficiency. For many purposes such fans can be supplied from the extensive line already designed. Both single and two-stage units available. Optional features include straight or curved delivery, bracket or flange connections, radio noise eliminator, and special motors where required.

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Here are some of the many uses for Joy AXIVANE Aircraft Fans: Windshield de-icing, windshield or wing de-icing, cabin heating, cabin ventilating, cockpit heating, cooling radio and electronic equipment, cooling voltage regulators, oil cooling, gun-cool cooling, instrument cooling, air recirculation, and high-altitude pressurized heating.

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this method gave less than three times the life of a high altitude, for example. Bell-Bayerl's West recommended putting jet engine igniter boxes in the extreme somewhere to get it away from high heat. He added that an experimental aircraft did not enter north where you put it.

► **Plug Leakage**—Spark plug leakage and venting igniter lead insulation is still a problem. Wright Field found that pressure buildup in harness leads goes as high as 1,000 psi, so it is difficult for the lead to resist ballooning. Wright Field wanted vents to allow pressure to escape.

Champion said that the glass and "U" strain R591 plug greatly reduced number of leaking plugs and amount of leakage of air gases plug. But the manufacturer warned that the "U" strain is no guarantee against leakage.

Intermittent corrosion of spark plug center electrodes seems to have been pretty well solved by better firing of the glass seal.

► **Champion**—Retains—Champion is testing internal-center electrode plug. Internal has some promise, not being prone to intergranular corrosion. But its electrical resistance is high.

Champion thinks that ground electrode problems may occur, center electrode problems in coming years. It has found temperatures as high as 1,900°F on ground electrodes.

Champion is interested in high-energy jet engine igniter and has some on test with major engine makers.

► **New Team**—Champion's Burns More light the meeting moving, with a ban from R. L. (Doc) Anderson, formerly of Chrysler & Southern Airlines, who now in Champion's engine manager, and his three assistants, Harry Archer (formerly with National), Russell El Engel (formerly USAF), and Ed Kooler (formerly United Air Lines).

Coated Connectors Make Flexible Bends

Every bend in the 42 ft. of leader or heat ducting in the Cessna 441 is made flexible with glass cloth tape sections coated with 36-10 silicone rubber.

The new 36-10, made from its parent material, 36-30 by the Silicone Products Dept. of General Electric, withstands temperatures of 600°F, is ozone- and abrasion-resistant, is unaffected by hydraulic fluid, and has constant flame retardancy, it said. It can be applied only with difficulty by an external flame and supports fire for only 6 sec or less.

The product is also said to have good glass-fiber breaking strength and burning properties for momentary stopped heater ducts.

NEW AVIATION PRODUCTS



Electronic Roughness Gauge Requires Little Skill

A actively responsive surface roughness gauge capable of being operated by personnel without special knowledge or training is being manufactured and distributed by Brush Electronics Co., under license from General Motors Corp.

Named the Surfindicator, the gauge has a range extending from 1 to 1,000 micro-inches average deviation from true surface. A variable cutoff switch permits separation of constant and roughness characteristics of surface by filtering out wavelengths exceeding 300, 600 or 930 in.

Further reference specimens, complying with American Standards Assn. and Society of Automotive Engineers requirements, are supplied with the device to assure accuracy.

The Surfindicator employs a diamond tip stylus which moves across the high and valleys of the surface being measured. The microscopic mechanical motion is translated into electrical signals by a movable plate vacuum tube transducer. These signals are amplified and indicated on the meter in surface roughness in average micro-inches. The operator need only select the proper roughness and cutoff scales, guide the pickup over the work and read the meter, says the maker.

Price of the Surfindicator is given as \$685. It weighs 15 lb and occupies less than one-half cubic foot of space. The device is operated with 115-v. 60-cycle current.

Brush Electronics Co., 3405 Peddie Ave., Cleveland, Ohio.

Small Panel Indicator Gives Wide-Angle Light

Herrington, Inc., has come up with a semiconductor indicator or warning light weighing about 1 oz. for stand-

FOR HIGH ENVIRONMENTAL TEMPERATURES NEW ADEL JET ENGINE ACCESSORY



One of a series of compact, rugged, lightweight valves and actuators designed and produced for jet engine and turbo-propeller engine applications.

OPERATION

- A Spring Offset, Two Position, Solenoid Operated, Four Way Valve using engine oil to operate hydraulic cylinders.
- B Solenoid energized, 3000 psi at inlet port produces outflow at cylinder 1—cylinder 2 open to return.
- C Solenoid de-energized, produces outflow at cylinder port 2, cylinder 1 open to return.

CHARACTERISTICS

- 1 Ambient temperature range -65°F to +350°F.
- 2 Operating pressure 3000 psi.
- 3 Ports per AND10030 are available in 1/4", 5/16", 3/8", and 1/2" tube diam.
- 4 No porting on sliding members.
- 5 Operating voltage 18-30 VDC.
- 6 Current required 1.0 amp. at 30 volts.
- 7 Continuous duty solenoid.
- 8 Pilot valve spring loaded against pressure to 4000 psi max.
- 9 Operating fluid MIL-L-7810.
- 10 Most interface type valve.
- 11 Weight 1.75 lbs.

ADSL produces a complete line of Aircraft Hydraulic & Pneumatic Controls, Actuators, Valves, Actuators & Fuel System Electrohydraulic, Engine Accessories and Line Supports.

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and/or edge-lit panels.

That hourly wide-angle visibility with large area contrast between base and lamp. Known as Series L 6000, it reportedly requires only 4 in. depth behind the instrument panel, not including wiring.

A standard AN-5146 lamp is extended far into the plastic lens, with inside beveling of the plastic serving to throw light throughout lens to illuminate entire display.

Lens measures 27/64 in. and is available in amber, blue, green, red or white. Richardson, Inc., Skoon Hall, Pa.



Units Measure Pressure, Acceleration Changes

Rohr Instruments, Inc., has recently completed design and development of a series of low-pressure, altitude, air-speed, acceleration and altitude controlling potentiometer type transducers.

Low pressure transducers, known as the S series, include a number of instruments in the 0.5 to 0.76 psi range for the measurement of pipe, differential or absolute pressure. Rohr claims to have produced a small size unit without sacrifice of resolution or linearity. Weight of all instruments in this series is 0.15 lb. Each measures 2 in. long by 2 1/2 in. in diameter.

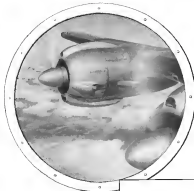
Altitude transducer series covers ranges from 0-70,000 ft. Instruments of all 5% over full range are standard.

Airspeed transducer series in the 50-700 mph range exhibits $\pm 0.75\%$ linearity and 0.25% acceleration over full range.

Linear acceleration transducers are designed by incorporated fixed systems. In this series, special emphasis has been given a number of low response instruments in the $\pm 1G$ to $\pm 5G$ range. Units range 1 1/2 to 3 1/2 in. weight, measure 2 1/2 in. in diameter and measure 3 1/2 to 3 1/2 in. in weight, measure 2 1/2 in. in diameter and between 7 1/2 and 15 in. in their length.

Altitude controller operates this way: Equal pressure is maintained on either side of the diaphragm until a reference valve is closed, holding a fixed reference pressure on one side of diaphragm. Instruments then respond to and indicate differential changes from reference pressure.

Rohr Instruments, Inc., 11 West Broadway, New York 7, N. Y.



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This is shown in Westinghouse Fire Control Systems. To make the equipment truly effective, it is necessary to analyze what the operator must perceive, interpret and translate for successful operation. The effects of entry nullifying evasive action must also be considered. Specific Human Engineering studies then indicate the extent of automatic devices, placement and shape of controls, presentation of information, reaction time factors, sequence and method of operation. Such scientific facts, coupled with Air Arm experience, result in optimum compromise between operator's capability and engineering feasibility... and a product designed with all the possible benefits to accomplish the required mission.

This progressive concept of product design comes from Air Arm, a wholly owned Westinghouse Division, devoted to the manufacture of autopilots, airborne radar, complete fire control systems, computers and guided missile components. Complete development, production, flight testing... and now Human Engineering... facilities concentrate unparalleled capabilities on the problem of bringing more practical, simplified—and reliable—airborne systems One Step Closer. J00111



A Westinghouse Human Engineered Autopilot is used in the Republic Aviation F-4 Thunderbolt, shown above. At right is close-up of autopilot controls, designed with maximum number of controls for maximum simplicity.

THE SCOPE OF WESTINGHOUSE IN AVIATION

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Ground equipment

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ALSO ON THE MARKET

Thermocouple Sponwell protection tube is made of stainless steel to resist corrosion both inside and outside. Non-precise in the standard sealant, with Teflon or asbestos-graphite also available. End fitting locks and seals 20 gage or 24 gage insulated duplex thermocouple in well. Seal is effected by compressing the Neoprene washer around the wires. Unit is supplied with a stainless steel adjustable endlock tube fitting for sealing and adjusting movement of protection tube into vessel. Various lengths are available in the protection tube, straight or with 90 deg bend. Diameter is 1/16 in. x .015 in. wall. End fitting is 1 in. hexagon by 1 1/16 in. long—Crescent Corp., 4513 Main St., Buffalo 21, N. Y.

Half-horsepower aircraft motor is open, self-ventilated, rated for continuous duty up to 35,000 ft. Output speeds are available from 1,500 to 5,000 rpm. Designated type GA, the unit operates on 3-phase, 400-cycle alternating current. The design will reportedly meet USAF specification 12990. Leading features claimed for the motor are thermal overload protection, integral cooling fan, hardened and ground helical gears, internal spline takeoff shaft, AN mounting pad, speed acceleration and high torque—U. S. Electrical Motors, Inc., Aircraft Div., Terminal Annex, Box 1054, Los Angeles 24.

Metallizing machine, called Vacon, is used to eliminate the need for manual adjustments through incorporation of a new type nozzle. Unit is operated by the light-tight, compact and easy to operate. All bearings in the new feed mechanism are mounted in the rear.



body, gas case casting. Backfire is eliminated by means of a gas mixing chamber which is built on the inside of point of combustion—Vandenberg Engineering Co., Inc., 727 W. 7th St., Los Angeles, Calif.

Another Thompson "First"...

T.P.M.

makes the big difference
in valve life

ORDINARY VALVE



T.P.M. VALVE



These two Thompson valves from Pratt and Whitney Aircraft R-4360 Engines were photographed after first overhaul.

T.P.M. is the new valve material developed by Thompson to give greater corrosion resistance and higher strength at valve operating temperatures. T.P.M. is a result of Thompson's vast experience in valve development and knowledge of the behavior of metals at high temperatures.

Other Thompson "firsts" include a new coating alloy for valve heads and faces, and atom-peening to provide harder, more wear-resistant stem surfaces.



VALVE DIVISION

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1. TRANSISTOR production, from a soft-white powder called germanium dioxide to a thumbnail size unit (left) is a difficult, complicated process involving centrifuge, microscope and x-ray-type control devices. Close checking must be maintained throughout the process. The manual work of photo takes at Ithco-Inc., Eastham, Conn., details important steps in manufacture of a point-contact transistor.

How a Transistor Is Born



2. BAKING the essential ingredient, germanium dioxide, in a hydrogen atmosphere is the first step in the life of a transistor. This stage of the process produces the required germanium oxide.



3. GROWING increase converts the input into a single crystalline structure. A helium atmosphere is also maintained in this factor to insure extension of sublimable impurities.



4. SLICING crystal into sections approximately 0.010-in. thick is done (above) after purity check, made by measuring crystal's resistance. Purity must be in order of one part in ten million of germanium.



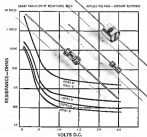
5. DICED germanium following electro-casting into particles approximately 0.040 in. up. Each of these will become a transistor. Next, particles are etched and cleaned (Picture story continues on p. 77.)

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Type 35PAB-X, in lots of 500: 35¢ each. Type 95AB-X (thermally sensitive) costed in lots of 500: 45¢ each.

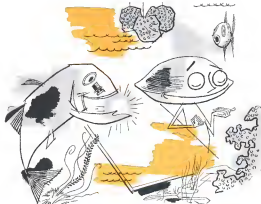
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Thermistor Probe—The tip of a thermistor probe is used to measure temperature. It is a small, sensitive device that can be used to measure temperature in a variety of applications.

• Take bellows assemblies, for example. Designing and producing them is a specialty at Fulton Sylphon and Bridgeport Thermostat. But here, too, it's a specialty. For it's only unusual that so many users of bellows assemblies come to us.

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6. ASSEMBLY of precision parts and wear parts wherever is done with precision under a microscope. Wire spring (approximately 0.004 in.) has critical effect on performance.



7. SEAL sometimes makes two-side assembly after precision boring and adjustment. Precision turn was one of the last steps to produce for carefully sealed seals.



8. FINAL TEST measures the seal's strength. Fulton Sylphon uses a range of rapid signal frequencies. Laboratory-type techniques would indicate only limitations primarily in response and load to make.

what's our line?

it's these **BREEZE** precision products for industry...



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From our famous AERO SEAL, Breeze Clamps with precision worn, gear drive—with scales of industrial units—to custom-built special purpose clamps to withstand heavy pressure, extremes of temperature and vibration, and to resist corrosion. Any design, metal or quantity.



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LIFE SAVER—Only a few minutes after bailing out of his crippled jet fighter, this Air Force pilot was rescued from the Yellow Sea off Korea by a Sikorsky HO4S helicopter.

Such "Guardian Angels" hover just out of enemy range, ready to answer emergency calls. The rescue technique shown is responsible for saving hundreds of U. S. pilots.

AROUND THE WORLD WITH SIKORSKY HELICOPTERS



PRISONER EXCHANGE—During the exchange of sick and wounded war prisoners in Korea, Sikorsky HO4S helicopters of the Army's 6th Transportation Helicopter Company flew a steady shuttle between the exchange point near Munsan and Kaepoda in Seoul. Six prisoners were carried on each flight during the week-long operation.



INTERNATIONAL SERVICE—Sabena Belgian Airlines in August opened the first scheduled international helicopter passenger service, supplementing its regular airline service to all of Europe, the Near East and Africa. Using big Sikorsky S-55s, helicopter flights will serve cities in Belgium, Holland, France, Germany and Luxembourg.



FAST SERVICE—With Sikorsky S-55 helicopters, the first regularly scheduled U. S. helicopter passenger service has been opened by New York Airways. In July, regular passenger flights began between LaGuardia, New York International, and Newark Airports in the New York City area. Only minutes are needed for inter-airport trips, which were took hours by surface vehicle.



SIKORSKY AIRCRAFT

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One of the Four Divisions of United Aircraft Corporation

Midget Capacitor Matches Transistors

A new tantalum capacitor, smaller than the head of a kitchen match and possibly the smallest high-capacity, low-voltage capacitor yet developed, has been announced by General Electric's Capacitor Dept., at Hudson Falls, N.Y. The new electrolytic capacitor is the first of a new GE line designed for use in transistor circuits. It should enable engineers to realize some of the long-looked-for space-saving possibilities of true miniaturization.

GE's capacitor, which measures 1



in diameter by .6 in. long, is available in ratings of 0.7 to 4 microfarads

with voltage ratings of 2 to 16 v. A slightly larger capacitor, 5 in. long, is available in 1.5 to 3 microfarad sizes and the same voltage ratings. Temperature range is -55C to 55C, but units can be operated at lower or higher temperatures with same voltage or life during GE says.

The new capacitors use a non-welded electrolyte and are sealed against leakage or contamination. GE says units exhibit long shelf and operating life and low leakage current. They are recommended for use in non-critical, non-vital applications such as coupling, bypass and filtering.

FILTER CENTER

► **Transformer Design Manual**—The American Research Foundation has devised a monograph method of designing small power transformers which it says greatly reduces the cut-and-try type of calculations previously required.

► **GE Autopilot for F-80F**—General Electric has been selected by Republic Aviation to design the automatic pilot for its new F-105 after a bid design competition in which Minneapolis Honeywell and Westinghouse were its principal close contenders.

► **Motor Standard**—A five-cm-dia. in-line, cassette, called the largest and fastest yet constructed, for use in testing automatic controls used in aircraft and missile guidance, has been developed by the American Research Foundation for the Aeronautical Lab. at Wright Air Development Center, Dayton.

—JK

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Only the C-119, specially built for the job, could land and take off with heavy loads from the tough terrain encountered in combat areas. An important new feature of the Fairchild C-119 is the special Rough Field Landing Gear. The lever suspension principle used in its design facilitates clearance of

obstacles, substantially reduces dynamic loads and permits full efficient shock absorption. Also incorporated are follow-up steering with increased power, shock-free retracting wheels and free-floating torque axle. In every detail from nose to tail, the "Flying Boxcar" as built for the rugged job it is called upon to do. No other dual-engine airplane can compare with the combat proven C-119!



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NEW ALTITUDE CONTROL

Engineered altitude controller for the new Minneapolis-Honeywell 2-24 automatic pilot, fitted for use on the F-80D, F-100, and CF-100, can detect underlying fuel injection. The device which permits rapid fuel injection to deployment and rate of change of displacement of fuel from pre-selected altitude, will respond to barometric altitude changes as small as two feet, MHR says.

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FINANCIAL

New Progress Pay Policy Studied

Aircraft industry will have no trouble getting money from banks, but dividend restrictions are likely.

The question on progress payments as a result of a tight Defense Department policy in financing aircraft production is being studied carefully by industry observers. In effect on earnings and financial progress will undoubtedly be important, but will vary throughout the industry.

Observers of progress payments have been a major cause of aircraft production constraints and have had a tendency to obscure the more conventional sources of funds which previously were to be called into greater play.

Aircraft contractors with prime contracts should experience little difficulty in obtaining necessary capital to finance operations.

Government Policy—As a matter of fact, the government has long wanted that private banking money be used before calling upon the government for financial assistance. A directive issued by Robert Lovett, then Deputy Secretary of Defense, on Oct. 14, 1950, declared:

"In determining what form of financing shall be recommended as most advisable, the following order of preference should generally be observed:

(1) Private financing without government guaranty; (2) progress or partial progress payments; (3) guaranteed loans with financing institutions participating to an extent appropriate to the risk involved; and (4) advance payments."

In viewing these financing sources working capital requirements are generally involved. Other conventional means are available to finance plant expansion which entail the purchase of plant sites, buildings, and related equipment.

Dividend Restrictions—With aircraft contracts, on the whole, are a relatively high sustained basis, guaranteed dividend payments have been anticipated this year and next. Should substantial bank borrowings now become necessary, credit agreements are likely to contain restrictions against dividend payments which would tend to restrict working capital positions usually.

The important element seems to be to have the price of capital so acquired will be absorbed in operating cost structure of the separate companies. On consolidated basis type contracts, interest generally is a considerable

item and earnings should therefore be satisfactory. This type of award, however, is now of limited application and is being studied carefully by observers.

Effect on Profits—Under level price awards of the Air Force, which are more widespread, interest charges are not allowable as proper costs in establishing contract prices. In other words, this cost of doing business will have to come out of the contractor's gross profit margin.

But no uncertainty will prevail as to the final consequences. In the first place, an offsetting factor will be present in the tax credit. This will serve to reduce the added interest cost by 52%, providing no other profit tax costs and the numerous corporate tax credits and tax rate cuts prevail. Finally, the more important and conclusive is the effect on net earnings after the Reconstruction Budget passes on the company's operations.

The fact that a builder was more dependent on financial resources obtained on its own, is likely to be a favorable factor in the degree of earnings the Reconstruction Budget may permit the company to retain.

Type of Loans—Commercial bank loans are the common loans. The principal types may be summarized as follows:

• **Ordinary commercial loans.** An aircraft company with an excellent financial rating can obtain bank loans solely on the basis of being a going concern contact. These loans are generally secured and are made without or independent of providing the borrower with a grant deal of facilities in conducting operations.

• **Bank loans secured by assignment of claims.** Many providers in financing aircraft operations under a government contract is the "assignment" privilege contained in contracts. Through this medium, the manufacturer may assign his right to receive payment to the lending bank. This permits the bank to receive payments directly from the government. Assignment of a claim under a contract does not in any way affect the other terms and provisions of a contract. The manufacturer still is responsible to complete delivery and the requests for payment before any one can be paid. All the assignment does is to change the person or entity



Engineers— PICK A WINNER

The Engineering Department which supports the design and development of new military airplanes has openings for engineers—superior in aircraft design, engineering, and in the field of aircraft design, or that have been able to work with aircraft experience. Long term military contracts and benefits for years of continuous employment with the United States of North America. Current openings in:

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Our personnel offices are located at 4700 West 10th Street, Indianapolis 6, Indiana. Hours—7:30 a.m. to 4 p.m. Monday through Friday. Saturday hours—9:30 a.m. to 11 a.m. Please bring birth certificate and discharge papers.

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to whom the payment is to be made.

• **Government-Guaranteed Loans:** Under certain conditions, the aid extended may be such that concerned banks will hesitate to grant loans to companies lacking government contracts. To encourage loans under such circumstances, Congress passed Section 364 of the Defense Production Act of 1950. This permits government agencies to guarantee the lending with funds that the government will absorb all or a specified portion of any loss resulting from nonpayment.

This policy is an outgrowth of the successful experience of the V type loans during World War II. (During World War II more than 6,000 individual V loans with an aggregate amount of \$13 billion were guaranteed by the government.)

Government agencies who can now guarantee loans are: Department of the Air Force, Army, Navy, Commerce, Interior, Agriculture, General Services Administration and the Atomic Energy Commission. While each of these guarantees has its own regulations on guaranteeing loans, a common pattern generally prevails.

• The amount loaned is based on and tied to a government determination as to the amount the financial condition of the lender warrants. The maximum amount loaned to any one borrower is not limited by statute.

• The Federal Reserve Banks are the central agency for clearing V loans for final approval.

• Interest rates to be charged by banks may not exceed 5% on loans for which guarantee is sought.

• The government guarantee may cover all or part of the loan.

• The charge for guaranteeing a loan will vary with the proportion of the loan guaranteed. The government fee ranges from 1/16 of the amount on the guaranteed percentage of 50% or less, to 4% of the interest rate on one of a 100% guarantee. The cost of the guarantee is paid directly by the bank. (The guarantor then asks the bank, however, the loan is more as guarantee fee.)

In all of these forms of bank loans it is customary to provide for various protective provisions. This is particularly significant at the present time in the light of the recently stated Department of Defense policy.

With 1954 the first fifth year to feel the effects of adjustments is financial progress as a result of the new Department of Defense directive on progress payments tied with the Reorganization Board generally, unable to make its services for at least a year or two, it can be some time before the full consequences of the current policy decision can be known.

—Selig Altschul

180 m.p.h. push-up . . .



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AIR TRANSPORT

Government Continues Financing Towers

- Commerce staff study finds transfer of air traffic responsibilities to local governments is not practical.
- Administration probably will pay for CAA operation of airport control centers from fuel tax revenues.

By Lee Moore

Commerce Department last week decided that Civil Aeronautics Administration should continue full operation of the 350 airport control towers in the United States after a study found transfer to municipal responsibility was not practical at this time.

The federal government plans to finance part of the local tower operation by increasing "user charges" to be levied on civil operations to help pay their share of the cost of CAA's Federal Airways Service.

The probably will take the form of an Administration request that Congress raise the money through the aviation fuel tax.

Practical Alternative—These decisions resulted from a study by Undersecretary for Transportation Robert Murray, who found that transfer of local tower operations to municipal responsibility was possible but not practical under present circumstances.

The increase in user charges (now three annually planned) to pay for federal airports operations only is the department's alternative to its previous hope that a private party might be found to carry this share of the local tower operation responsibility.

Tower Policy—Murray said he invited a Commerce Department study last summer to find if there was any way to divide the traffic-handling responsibility among federal and municipal governments and users. This is in line with the Administration's "cooperation of everything," the Undersecretary told Aviation Week.

Murray's staff decided the federal local divisions could be made between instrument and visual flight conditions.

The staff's remaining hold that places flying on visual control under the local area on their own and are local traffic from a practical standpoint, regardless of where flight originated.

Tower positions in this type activity could be identified and number of visual flight landings and takeoffs counted to show local financial responsibility.

On instrument flight operation, CAA

Airway Service blends right into tower control, making bad-weather local operation a federal responsibility all the time. This was the theory.

Answered Scepticism—Staff members checked the plan by a survey of opinion of 16 municipal aviation authorities. Of the 16, eight said they probably would go along with it and join the added cost on to the airport user fee (higher airport charges), but they would have to check further to give full consideration.

Three said they would clear down their tower operations. An additional CAA will continue to maintain them.

Only two cities said the plan was not to work smoothly with them.

Commerce Department and CAA studied the pros and cons and decided the plan would not be practical in operation, despite its excellent simplicity of division between federal and local responsibility.

Aspect And Outlook—Commerce is not a fanatical on the quality responsibility for airport development. An industry panel is advising the department on the question of whether the federal government should get out and let the state and private industry, which theoretically pays half the cost of airport construction.

Murray told Aviation Week that some congressional, important segments of the panel, "tendency to envision," before airport development will prosper unless if the federal government steps out of construction financing and planning. But the report of the industry advisory panel will carry "disaster, and disaster to the disaster," he said.

Outlook is that the Administration will urge Congress to kill the entire federal airport aid program, despite the fact that some segments of the aviation industry strongly oppose such action.

Present talks such as those at Buffalo, N. Y., to try to get all of the federal airport liability resolve will not work, Murray said. Decisions on federal airport aid will be made without regard to local payment, he explained.

Airline Concern—Murray told Avia-

tion Week the subject, in principle, had become widely discussed over the Commerce Department tower study as a threat, whereas it was aimed at getting the facts and deciding afterward.

The Undersecretary explained his intention to speak to United Air Lines executives in Chicago last week, as an opportunity to enlarge upon the Department Administration policies and programs in civil aviation.

Theirlines had expressed deep concern over the Commerce study aimed at possible change of control over responsibility, but Murray told Aviation Week that this was merely one of many national studies made by the new Administration without any preconceived notions of how they would come out.

Policy Foremost—Here is a summary of Murray's review and forecast of Administration policy on civil aviation: CAA will continue to maintain them to overall aviation safety and efficiency.

The new Administration has transferred large chunks of non-essential activity from the budget, but actually has transferred the federal responsibility for safety of interstate operations, Murray said.

CAA Expansion—Murray reviewed for Aviation Week a few examples of CAA expansion that was going forward under the present administration.

Franchise CAA activities—such as airport advisory service, "educational" and state department—have been given back to the industry and local governments.

The Undersecretary says the two can do a better job on these local aviation problems.

"Designee program" giving active industry mechanics and other specialists CAA authority, will go forward. It will involve the industry as well as budget reduction, Murray said.

Radar traffic control, fully implemented at Washington, D. C., will be expanded as rapidly as possible in other high-density areas.

VOR always now cover 32,000 sq. miles of primary airspace and 20,000 of alternate routes, compared with 15,000 and 10,000 respectively on June 1, 1952.

Other programs going forward include development of en route communication centers with towers, extension of control traffic control communication range up to 175 mi. beyond the traffic area by remote VHF systems and installation of more than 100 of 450 DME facilities.

Where necessary to forward its pro-

systems, the Air Development Command, CAA and Air Commanding General's studies, the Administration will ask new legislation, Moore says.

Management Firm Starts CAA Survey

The spending 15,000-man Civil Aeronautics Administration will go through a month-long efficiency and operations review by a leading management engineering consultant firm, Group, McGinnis and Frost.

The survey is slated to start on or before Nov. 1, and before Jan. 1, start of the next fiscal year. But changes will be made wherever and whenever they are found desirable as the study progresses, according to Commerce Department Assistant Secretary James Wootley. Commerce last week was negotiating final terms of the \$90,000 \$100,000 survey contract with the firm.

► **Top to Bottom**—Wootley and the team will go over all phases of CAA. This will include Washington and regional administration, field agent functions and reporting, airport control tower operations, etc.

Wootley emphasized that the study report on criteria of the present CAA but is typical of similar reviews under way elsewhere in the new Administration. CAA is the largest agency in Commerce Department.

Commerce has completed as soon as will visit similar studies on Bureau of Public Roads, Bureau of the Census and five new Business and Defense Services Administration—through NPA. The Roads study already was completed by Ross, Allen & Hamilton, who

organized Civil Aeronautics Board two years ago under the chairmanship of Delos Riedel. The BDBA survey was done by McKinsey & Co., and the Census Bureau review is in early stages of completion with a firm in contract.

► **Advice on Policy**—Commerce is taking of local industry consultation and reports on the policy side of its various agencies. The example, advice of the Weather Bureau (including airline, over-peak and private flying aspects, among others) also will produce substantial improvement in certain weather services to airlines, Commerce Undersecretary Robert Moore recently told Kenneth Wren. On CAA policies, the advice and other interested groups submitted written recommendations to Wren last spring.

► **First Project**—Wootley plans to assign one of his top staff men as leader on the project and CAA administration as without Ross Kemp will assign one or more of his staff to work with the group.

CAB ORDERS

(Oct. 12-18)

GRANTED

North Central Airlines temporary permission to serve Minneapolis, Minn., with one roundtrip per day on Route 56. Request Airlines special permission to serve Vancouver, Colo.

Rush, Alaska, and Northwestern Alaska Division of Commerce permission to State Airlines mail case.

State of Illinois information on Clark Air Lines route revised case.

► **Partial Airways**—United Airlines filed suit of \$1 under a two-day, Oct. 1, 1951, through Nov. 8, 1952. CAB rejected a Post Office proposal to require United to set up an express regulation committee to effect possible later losses that would require increased mail rates.

► **Post Airways**—United Airlines petition to require track service from Seattle to Honolulu. Speed restriction was needed to increase capacity of the service because FAA's present restriction limits flights on this route to through service to the Orient.

► **Portlands, Ark.**—service case intervention by Delta-Gulf Air Lines, Delta-Bulk, Ark., and Postmaster General. CAB denied petition of Delta and dismissed that of Trans-Texas Airways.

APPROVED

International Air Transport Association adopting special "B Class" rates in the Middle East.

Statewide inter-airline route between 29 groups of points.

REJECTED

United Air Lines Chicago-Seattle memory decision. CAB ruled that Northwest Orient Airlines may not be strong enough now to take direct competition on an economy route but may be able to do so because of recent and imminent flight schedule adjustments. Strengthening NWA's service pattern. CAB members Joseph McKee and John L. Howard, except at least a temporary one-way trial. Then, and Northwest is strong enough now and public should have more service on the disputed route.

SUSPENDED

Post Airlines' national charter rates by ground routes. CAB previously suspended similar rates proposed by United and Northwest for future charters. Board has refused to lift the national. Available against similar conditions.

UNFILED

Followed Airlines letter of resignation, which apparently ended operations only the next week, failed to clear before addressed to it by CAB at its last address.

DISMISSED

Request from the Denver service case at company's own request.

► **Partial Airlines**—Airlines complaint against Northwest's one-way passenger limit on north-bound cargo planes from Anchorage to Seattle.

DEFERRED

► **Midwest, Okla.**—consideration of its request for authorization of service between by Central Airlines to Oklahoma City by the Fayetteville, Ark., service case.

► **Eastern Air Lines** request that CAB direct against Airways, Continental, Eastern, Miami, and Transamerica Air Transport from the large singular carrier investigation.

► **Midwest Airlines** and United Airlines (at CAB request) the proposed North America-South America mailroute (at "Full Service") case by requiring the airlines to demonstrate demand for mail service. The President had asked CAB to review the case largely in light of the fact that it was so old that evidence is quickly spilling.



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AA FLIES FIRST DC-7 ACROSS THE U. S.

First Douglas DC-7 Wright Field Command postcard, Kansas City, delivered to American Airlines was flown from California to New York leaving last Monday at 6:15 in 12 min. last story on p. 17L. American plans to begin DC-7 service

cont-to-cont scheduled across Nov. 29 with planes making the flight in less than eight hours each way. The ten-hour round-trip service of the DC-7 planes 212,340 lbs. has 8,512 gal. fuel capacity. AA has 25 DC-7s on order.



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Nonscheduled Lines Face Hard Times

Many nonscheduled airlines face hard times in the coming year, possibly and economically. Main reasons:

- **Government cutbacks on contract** violations of Civil Aeronautics Board regulations maintaining non-scheduled (charter) routes from point-to-point service.
- **Military contract reductions** due to budget cutbacks and Korean truce.
- **Main competition** among scheduled and web-scheduled airlines and railroads. Bids are coming out for official military troop movements, despite general trend of other rail lines.

A few nonscheduled airlines may be profitable, and a few more will continue doing a fine business on strictly charter work, which CAB permits.

The cities have two possible major modes of travel:

- **Government cutting of certification requirements** through changes in present attitudes of CAB, the Administration and Congress.
- **Favorable interpretation** by a federal court of the Civil Aeronautics Act and CAB powers under it.
- **More government contracts** from military, Post Office and other agencies.

Washington observers do not foresee these developments in the immediate future.

• **CAB's Nonscheduled "Problems"**—The "unsolved problems" arose after World War II when many persons leased or bought surplus aircraft, and the Board would certify them for use. They therefore, were called "nonscheduled airlines."

To win the privilege of flying scheduled or charter, in airline must prove public convenience and necessity for its proposed route under the Civil Aeronautics Act.

• **Carroll Expansion**—Many airlines expanded their services with demand will become, in effect, scheduled without certification.

CAB decided in the transcontinental coach case that there was no need for new certified nonscheduled services. In the trans-Atlantic coach case, the Board denied there was no need for new trans-Atlantic coaches.

But the airlines have continued fighting for relaxing through the courts, Congress, Administration and CAB.

Some have realized Board restrictions, but CAB has been hard put to stop five through advancement proceedings, largely because of the delay of due process of law in the courts.

• **Trans-Texas**—The wheels of the process of law ground slow, but the Board's machinery of enforcement action against coaches is speeding up.

Repeated court decisions are narrowing the issue.

Repeat domestic scheduled and private target is North American Airlines.

The airline group recently won a court order delaying Board hearing on charges that smaller carriers violated regulations by operating scheduled flights (Aviation Week Sept. 16, p. 116). But NAA subsequently agreed to waive most arguments and spend up the proceedings after Supreme Court Justice Stanley Reed dropped it down.

Said Justice Reed: "The administrative remedies after ample protection to the applicant's rights had, until those remedies are exhausted, failed to contribute to help the Board hearing is not justified."

• **Merry Deacons—Attitude of White House and Commerce Department** has not been unswerving.

A Commerce staff team formed by Robert Murray, Undersecretary for Transportation, is making a study of the nonscheduled problem. Decision is usually coming, however. Certification will be required for scheduled, non-type operations.

• **Questionable Support—Nonscheduled** can count on support from some members of Congress.

But, in the past, it is likely to be scattered, largely vocal and of questionable effectiveness.

The Senate Small Business Commi-

tee, headed by Sen. Edward Brooke, will keep pressure on CAB to keep the nonscheduled in business. So far, this has resulted only in more cautious and slower Board action against applicants.

A special committee, the small business group does not have authority to legislate.

Outlook for support from Senate Commerce Committee has dimmed since a subcommittee, headed by Sen. John Stennis a Cooper, was appointed in August by the former chairman, the late Sen. Charles McNichols, to review policy on so-called competition.

Cooper hopes to hold hearings this fall, but the subcommittee's two other members—Sen. Dwight D. Davis and Edwin Johnson—are not expected to return to Washington to cooperate.

Commerce Committee's new chairman, Sen. John Stennis, probably will second the position of Johnson, who publicly has denounced activities of the nonscheduled and expressed the hope that the Cooper Subcommittee "will not be and eventually as a vehicle to persuade selfish interests not nonscheduled rather than the public interest."

• **Steadily Spreading—Not likely** to materialize a sustained talk of a speculative bubble in nonscheduled airlines, largely extravagant subsidies to the scheduled industry by the Senate's permanent investigating committee, headed by Sen. Joseph McCarthy. Such an investigation would create a favorable atmosphere for nonscheduled operators.

The committee's staff is looking into competition, but McCarthy told Aviation Week he does not expect the task to go farther than this.

Opposition to airline subsidies in House Appropriations Committee, where they come up for review in connection with CAB's budget next spring, may give the nonscheduled a splashback to curb their cost.

• **Declining Volume—Military contracts** have been a large part of nonscheduled business.

As CAB and competition restrict nonscheduled overseas contract more and more, the contracts will become even more important. Involvement alone restriction has been received by CAB must rely on contract business only.

Defense Department budget for personnel movements this fiscal year is about 25% less than last year. The Korean truce may cut it some next year. Pacific airlift phases out outside Korea.

• **Mail**—Contracts—Nonscheduled have passed Post Office and Board for the privilege of bidding for the new first-class mail service. But the Department has left this up to CAB.

The Board last week started an investigation to find if various other than those certified for airtel carriage rate had this new class of air mail.



BAKER CHECKS COPIER

George T. Baker, president and chairman of National Airlines, inspects the cockpit of a Sikorsky HO4 helicopter of the type NAA plans to put into service this winter as Phoenix. Temporarily at Phoenix, Lakeland, Fla., National is getting three HO4s, among the first eight U.S. airlines to use helicopters. Baker is shown with E. E. Coulson (right), Sikorsky sales representative, and Ken Rossmo, NAA stewardess.

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GAVEL is presented to TCA president Gordon McGregor (second from right), now president of International Air Transport Ass. Present are, left to right, Robert J. Spangher, TCA director; Dr. Walter Byrdell, TCA president; and former IATA president, Sir William Billard, IATA director general, McGregor, and the Hon. Lloyd Charron, Canadian Minister of Transport.



REPORT was made to IATA general meeting by legal committee chairman H. J. Florsdy (left), FAA, and committee secretary J. G. Gault, shown at a press conference.

International Executives At Montreal IATA Meet



DISCUSSION of the Montreal committee's second report by Hamilton Kenyon, IATA committee chairman (left), Capt. J. C. Kelly Rogers, Air Lines, committee chairman (center), and F. Goldschlager, TWA, vice chairman.



ANNUAL REPORT was presented by IATA general committee secretary Dr. H. J. Gervais (center). Listening, left to right, F. J. H. Johnson, assistant treasurer, H. T. Bussard, assistant secretary, J. B. Woodbridge, TAA controller and committee chairman, and A. J. Quin-Helen, IATA Chicago House.



ESCORT Canadian Prime Minister Louis St. Laurent with Mrs. Gordon McGregor, wife of TCA's president, at IATA dinner.



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SHORTLINES

► **Aerolineas Argentinas** plans to start service to Comodoro Rivadavia, although reports indicate that Teco and Pan American traffic to Comodoro are substantially lower than 1951.

► **Air France** is the second foreign carrier to join Air Cargo, Inc. (following Trans-Canada). A.C.I. vice president and general manager Henry Johnson says Air France's Chicago, London and New York services led to its decision to use pickup and delivery services provided by this agency at U.S. scheduled airbases.

► **Canada Pacific Airlines** placed start of scheduled Vancouver-Monroe City-Louis service Oct. 24 with stopover and domestic DC-6Bs, 10 to Vancouver-Monroe City and another 10 to Los Angeles.

► **California Aeronautics Commission** is publicizing the benefit of potential airline customers that a new state legislative act requires all ticket agencies and airlines guaranteeing to sell airline seats to file \$5,000 security bonds. This is to curb the problem of stranding passengers and airlines by dishonest and irresponsible brokers.

► **Delta-C & S Air Lines** vice president and controller Todd Cole says new orders on order will increase the fleet 55% by June 30, 1956. The company will use 35% capacity for the core based DAL and C & S fleets 7945-12. Cost of 10 Douglas DC-7s and 18 Douglas DC-7s is about \$35 million, probably requiring \$15 million bank credit, which would increase debt ratio to peak of 50% during period of maximum borrowings and equipment replacement, he says.

► **Laurel Municipal Airport**, St. Louis, will get airborne-type runway, plus runway lengthening by 2,300 ft. to total 31,000 ft. as proposed by McDowell Aircraft Corp. and approved by the city's Board of Estimate and Appropriations. Cost is \$350,000, of which city gets up \$150,000 and the company \$200,000.

► **Oakland Municipal Airport's** Board of Port Commissioners says it will "look with favor on possible withdrawal of a \$1.2-million Air National Guard base" there.

► **Riad, Airlines**, cargo carrier, proposes \$40.50 San Francisco-New York flight service to fill out directional load imbalance.

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What Are the Facts About Business Aircraft?

Two officials of National Business Aircraft Assn. take strong exception to a news story in *Aerospace Week* Oct. 5 that reported a new information service for business aircraft operators.

The new company is Robert Hewitt Associates in New York. The story did not refer to the Association either directly or indirectly.

"The substance in the first paragraph that 'reputable information about the field is scarce' is entirely erroneous and misleading," wrote Jack Debusque, executive director of NBAA.

"Virtually all of the serious Hewitt indicates that they plan to perform are currently being conducted by the Association. We have been carrying out these activities with little fanfare and it has fully paid off through greatly increased membership," Debusque notes.

"Perhaps the most amusing statement made by Hewitt is, 'While companies and manufacturing organizations are interested in producing new products for the business field, but they have not been able to do so because of a lack of knowledge on their part as to what is wanted and what is needed by the corporate owner.'"

"I am sure," Mr. Debusque writes, "that Mr. Hewitt didn't mean what he said in the second, 'The corporate owner . . . doesn't possess sufficient knowledge to ascertain his needs properly.' If he expects to build a service on the assumption that the operator of business aircraft is ignorant of his own requirements, then he has found new to him. Certainly, no operator would appreciate the view that he lacks intelligence enough to ascertain his needs. Our members have outstanding records of achievement in business aircraft operations and many are renowned throughout the improvements that can be made by manufacturers and suppliers."

Mr. Debusque, in his letter, hopes to "set the record straight and not leave the impression that the interests of the business flyer have been overlooked or neglected."

Another indignant letter came from NBAA's chair man of the board, Cole H. Morrow.

"I am quite amazed," he wrote, "that you would devote so much editorial space to a purely promotional undertaking, particularly when, in the past, *Aerospace Week* has reluctantly ignored the business flying segment of aviation."

"Like most advertising copy," he writes, "the article is distorted, inaccurate, and certainly not supported by the facts. I am amazed that Mr. Hewitt would lend his name to the quack in the article. Apparently neither Mr. Hewitt nor your editorial staff read any other aviation journals because there has been much comment and data published which contradicts statements in the article."

Aerospace Week welcomes the opportunity to present its viewpoint on business or utility aviation, as well as to give full opportunity to NBAA, which has distinguished itself by its superior scientific on the subject. Mr. Hewitt had exercised, instead, to render plaudits of cooperation from NBAA, welcoming him into the field.

We consider business or utility aviation as exceedingly important, or we would not devote so much space to this controversial topic.

We are firmly convinced that too little basic information exists about business flying, and our opinion is based not by important aviation and financial people we

have talked to for more than two years. Most stirred by Mr. Hewitt since publication of the story would assure officials of NBAA. It indicates there is an important demand for the right kind of information—not mere handouts or publicity pieces about individual companies that operate planes.

Aerospace Week operates on the basis that all intelligent men constantly seek more information to guide their business decisions. No intelligent businessman has his eyes to any one source of successful information. No association in this important and dynamic field of aviation should feel it has a right to try to maintain a monopoly on information and services and we are sure NBAA did not mean to display such an attitude.

Mr. Debusque did not read our story carefully or he would know that it at no time cast any aspersion on NBAA. It merely said reputable information available is scarce, which it is. Nor did the story anywhere indicate that NBAA has not been one of the principal authentic sources of information. We just avowed there haven't been enough such sources. Nor did we indicate in any way that NBAA has not tried conscientiously to apprise the segment of aviation. We think there is further opportunity not only for those new in the field but for newcomers, too. Nor did we indicate that NBAA had not cooperated with Mr. Hewitt, because they did.

We do disagree with Mr. Debusque that "virtually all of the serious Hewitt indicates they plan to perform are currently being conducted by the Association." The record does not bear this out.

Further, Mr. Debusque in his letter has substituted the word "intelligence" for "knowledge," in referring to that part of our story which said, "The corporate owner, on the other hand, doesn't possess sufficient knowledge to ascertain his needs properly."

As to Mr. Morrow's comments, we devoted extra space to the Hewitt story because we thought it was news—a new effort to increase the man vital of knowledge about this vital field of aviation. There is no reason for any publication to publish a "purely promotional undertaking" (this is still a land of competition and private enterprise, we feel), nor is there any reason to force any trade association, even though it feels it has a vested monopoly in its field.

Obviously, the story was not "advertising copy," any more than stories about NBAA would be, or future stories about firms that may become Mr. Hewitt's competitors. And Mr. Morrow has done himself and NBAA no service in stating that most advertising copy is "distorted, inaccurate and certainly not supported by the facts."

NBAA meets in St. Louis for its convention this week. We wish them well, but since they have brought the subject up we hope they dust off their glasses, improve their vision, and start on a real service program that gets well above the mere publicity and promotional levels.

—Robert H. Wood

1912 Lawrence Sperry, at 15, flew automatically with the first Sperry Gyroplane. In 1914, Sperry was awarded the French War Department for the first "stable airplane."



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